Columbia County

Local Mitigation Strategy
2020

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Executive Summary

According to Title 44 CFR §201.1, the purpose of mitigation planning is for State, local, and Indian tribal governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources.

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards, Title 44 CFR §201.2. The mitigation initiatives or activities may be implemented prior to, during, or after an event. It has been noted that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.

The Columbia County Local Mitigation Strategy (LMS) details the continual work of the Columbia County LMS Working Group (WG) over the past several years to develop the comprehensive planning process and an analysis on the risks posed by natural disasters and their vulnerability, extent and impact to those risks. After reviewing risks and vulnerabilities, the greater community has agreed upon mitigation goals, objectives and measures intended to reduce, or in some cases, eliminate future losses due to these risks.

This local mitigation strategy seeks to accomplish the following:

- ✓ Identify and describe hazards to which Columbia County is vulnerable;
- ✓ Identify and assess the facilities, structures and other assets within Columbia County that are most vulnerable to particular hazards;
- ✓ Set goals and objectives as a strategy to mitigate property against future losses;
- ✓ Based upon these goals and objectives, identify and prioritize mitigation projects that will take advantage of available funding and reduce future losses;
- ✓ Identify potential funding sources; and
- ✓ Promote hazard risk awareness and mitigation education.

Columbia County is threatened by a number of different types of natural hazards (i.e. flooding, sinkholes, hurricanes and tropical storms, tornadoes, thunderstorms, strong winds, hail, lightning, riverine erosion, wildfires, drought, heat wave, winter storms, and freezing temperatures). These hazards endanger the health and safety of the population of the county, jeopardizing its economic vitality, and imperil the quality of its environment.

Extensive research and analysis has been performed to identify the hazards threatening the jurisdictions of Lake City, Fort White and unincorporated Columbia County to estimate the relative risks posed to the community by those hazards.

This study has been used by the Working Group members to assess the vulnerabilities of the facilities and jurisdictions of Columbia County to the impacts of future disasters involving those hazards. With these identified, the WG has worked to identify proposed mitigation projects or initiatives that will avoid or minimize these vulnerabilities and to make

the communities of Columbia County much more resistant to the impacts of future disasters. The proposed projects have been identified and developed and will continue to be evaluated by the Working Group for implementation whenever the financial resources become available.

The mitigation project list is considered a "living document". The project list will and should evolve as projects are undertaken and completed, as future disasters affect the county and new needs are identified, and as local priorities change. As the mitigation projects identified in this plan are implemented, step-by-step, Columbia County will become a more "disaster resistant" community.

The Federal Emergency Management Agency (FEMA) and the Florida Division of Emergency Management (FDEM) require that this document be adopted by the following governing bodies; City of Lake City, the Town of Fort White, and unincorporated Columbia County. Adoption of the Columbia County LMS by the City and County Commissions will not have any legal effect on the Comprehensive Plan or any other legally binding documents. However, adoption of the LMS will give the County and its jurisdictions priority with respect to funding for disaster recovery and hazard mitigation from state and federal sources.

Through publication of this LMS plan, the Working Group continues to solicit the involvement of the entire community to make the people, neighborhoods, businesses, and institutions of Columbia County safer from the impacts of disaster events.

Plan Organization

Columbia County's Local Mitigation Strategy Plan is organized into the following sections and appendices:

Section 1	Introduction
Section 2	Planning Process
Section 3	Columbia County Profile
Section 4	Hazard Risk and Vulnerability Assessment
Section 5	Mitigation Strategy
Section 6	Plan Evaluation and Maintenance
Appendix A	LMS Working Group Meeting Documentation
Appendix B	LMS Projects or Initiatives
Appendix C	Columbia County Community Wildfire Protection Plan
Appendix D	Article on Roads and Neighborhoods in Columbia County Prone to Flooding
Appendix E	Flood Mitigation Outreach Material for the County Residents

Section 1 – Introduction

Natural Hazard Mitigation Saves

Figure 1.1 – Nation Saves through Mitigation Programs

As stated by FEMA, see Figure 1.1 to the right, the nation saves $4 for every $1 spent on mitigation programs. And, $6 for every $1 spent through mitigation grants funded.

An effective natural hazard mitigation plan and program would save the County and is essential in reducing the risk of loss of life and property from future disasters.

Every community is exposed to some level of risk from hazards and hazards cannot be eliminated, but it is possible to determine what hazards will affect the county communities, where they are most severe, and identify mitigation projects or initiatives that can be taken to reduce the severity of the hazard.

As previously noted, mitigation is any action taken to permanently reduce or eliminate long-term risk to people and their property from the effects of hazards.

Examples of mitigation projects for Columbia County might include:

- ✓ Purchase or acquire repetitive loss properties;
- ✓ Build and construct a new critical facility to serve the residents of the county;
- ✓ Wind retrofit critical facilities that provide essential services; and
- ✓ Retrofit existing structures to meet new building codes and standards.

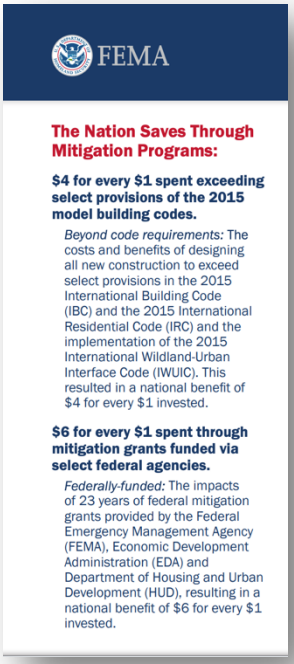


Image Source: https://www.fema.gov/media-library-data/1528727738945-e9805d8703ed4a1b02c5e2861b7ac65a/MitigationSaves_FEMA_180611_508.pdf

Ideally, a community can minimize the effects of future hazards through a mix of code enforcement, planning, and responsible development.

The County's critical facilities are those facilities necessary for a community's response and recovery from a hazard event. Categories for Columbia County's critical facilities would include: sheriff's office, police departments, dispatch center, emergency operations center, emergency medical services, fire departments and stations, wastewater treatment plant, water treatment plants, lift stations, solid waste center, water well and tank, radio and communication towers, county health departments, medical, health, rehab and kidney centers, nursing centers, public schools, city

halls, community centers, point of distribution centers, disaster recovery centers, logistics, special needs, general and risk shelters, road department, utilities, financial institutions, storage of critical records, and the county jail and prisons should not be placed in high hazard areas because the function these facilities provide are too valuable to be placed in jeopardy, especially during times of disaster, and are essential to the well-being of the community served by these systems.

The community infrastructure such as bridges, roads, drainage structures, sewer lines, electric lines, telephone lines that are built in high hazard areas are subject to frequent damage and extremely costly repair. And, if a local government belongs to the National Flood Insurance Program (NFIP) and allows development in the floodplain without proper elevation and construction techniques, the federal government can withdraw the community's access to federal flood insurance for both public and private structures. Furthermore, a local government is responsible for as much as 12.5% of their local public cost of a federally declared disaster and 100% of any damage from smaller events that are not declared disasters. These costs can put a significant strain on the local government budget.

The goal of having an established Local Mitigation Strategy (LMS) as an ongoing process will make hazard mitigation part of the daily functioning life in Columbia County. It serves as a bridge between local governments' programs, plans, and policies including but not limited to the comprehensive growth management plan, comprehensive emergency management plan, land development regulations, building codes and ordinances for effective floodplain management.

Over the last 30+ years, FEMA and the United States Congress have witnessed substantial increases in disaster response and recovery costs; as a result, they have provided funds to communities, counties, and states to reduce impacts from natural hazards through hazard mitigation. This marked a fundamental shift in policy; rather than placing primary emphasis on response and recovery, FEMA's focus broadened to incorporate mitigation as the foundation of emergency management.

The Columbia County LMS Working Group prepares the community, the businesses and institutions in becoming more resistant to the impacts of future disasters by evaluating the exposure of the community to all types of future natural hazards in order to identify ways to make the county more resistant to their impacts. This document reports the results of that planning process for the current planning period.

The Columbia County LMS is intended by the Working Group to serve many purposes. These include the following:

- ✓ Structured planning concepts in a methodical process to identify vulnerabilities to future disasters and to propose the mitigation projects necessary to avoid or minimize exposure. Each step in the planning process builds upon the previous process so that there is a higher level of assurance that the mitigation projects proposed by the participants have a valid basis for both their justification and priority for implementation. It is then an important element for the LMS plan is to document that process and to present its results to the community.

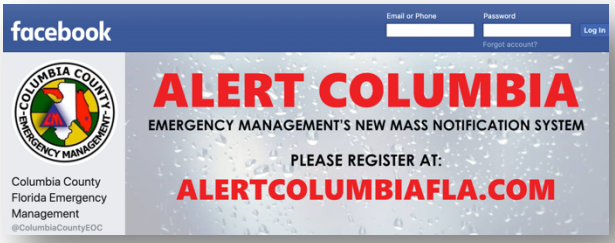
- ✓ Continual search for new ways to make the community as a whole more aware of the natural hazards that threaten the public health and safety, the economic vitality of businesses, and the operational capability of important institutions.

- ✓ Providing details on specific vulnerabilities of the neighborhoods of Columbia County and many of the facilities that are important to the community's daily life. This information will be very helpful to individuals that wish to understand how the community could become safer from the impacts of future disasters.

- ✓ The Committee/Workgroup continues to seek new opportunities and ideas to provide information and education to the public regarding ways to be more protected from the impacts of future disasters. The County has been active in communicating with the public and engaging interested members of the community in the planning process. This document, and the analyses contained herein, is the principal information resource for

this activity. The Columbia County Department of Emergency Management has an active Facebook page to connect with the community residents:

https://www.facebook.com/ColumbiaCountyEOC/



- ✓ Furnish the required information needed by the managers and leaders of local government, business and industry, community associations, and other key institutions and organizations to take actions to address vulnerabilities to future disasters. In addition, it provides proposals for specific mitigation projects or initiatives and programs that are needed to eliminate or minimize those vulnerabilities.

These mitigation projects have been justified on the basis of their economic benefits using a uniform technical analysis, as well as prioritization for implementation utilizing a selected criteria approach. This path is intended to provide a decision tool for the management of participating organizations and agencies regarding why the proposed mitigation should be implemented, which should be implemented first, and the economic and public welfare benefits of doing so.

A key purpose of the planning process utilized by the Columbia County Working Group is to ensure that proposals for mitigation projects are reviewed and coordinated among the participating jurisdictions within the county. These projects can be adopted and implemented for the jurisdiction's own purposes and on its own schedule. In this way, the format of the plan and the operational concept of the planning process ensure that proposed mitigation projects are coordinated and prioritized effectively among jurisdictions, while nonetheless allowing each jurisdiction to adopt only the proposed projects that it actually has the authority or responsibility to implement when resources are available.

The planning process used by the LMS WG meets the analysis and documentation needs of the planning process. The plan utilizes technical analysis and the formulation of proposed mitigation projects for incorporation into this plan.

The following sections of the Columbia County LMS present the detailed information to support these objectives. In addition, it documents the structural and non-structural mitigation projects proposed by the participating jurisdictions to address the identified exposure. The plan will also address the goals and objectives of the Working Group for the next planning period, during which this plan will continue to be expanded and refined.

Section 2 - Planning Process

Requirements:

§201.6 (c) (1) - The plan shall include documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process for each jurisdiction, and how the public was involved.

§201.6 (b) (2) - An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

§201.6 (b) (1) - An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

§201.6 (b) (3) - Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

§201.6 (c) (4) (iii) - Discussion on how the community will continue public participation in the plan maintenance process.

The Columbia County LMS is a local community product, which was developed by the LMS Working Group in 2005, 2010, 2015 to be in compliance with the DMA 2000 requirements, and currently in 2020 for the 5-year required update. The current LMS plan will expire 12/14/2020. The final draft of the 2020 updated plan will be submitted to the State of Florida by June 14, 2020 for review and approval.

The Columbia County Department of Emergency Management initiated the LMS planning process by hiring consultants to author the updated LMS plan. Facilitated by the consultant, the EM Department and the Working Group worked together to engage local agencies and community members in the planning process. The LMS working group engaged local agencies, community members, neighboring communities, regional agencies and the public to be involved in the planning process, beginning with a kick-off meeting on December 17, 2019. See LMS working group meetings listed below and all meeting documentation (i.e. meeting advertisements, sign-in sheets, current working group members, and meeting minutes) in Appendix A.

This section describes the organizational structure used to complete the public planning process.

Planning Area

There have been neither new municipalities created nor any dissolved since the last plan approval date. The planning area continues to include Columbia County (unincorporated), the City of Lake City, and the Town of Fort White.

Local Mitigation Strategy Working Group Members

The Columbia County LMS Working Group is made up of a number of local government agencies, community businesses, residents, and organizations, regional agencies, representation from each jurisdiction, institutions, and neighboring jurisdictions.

The Columbia County LMS Working Group *encourages participation* by all interested local and neighboring jurisdictions, regional agencies, organizations, and individuals. Broad community representation is promoted in the Working Group and at public meetings to provide ample opportunity for public commentary and consideration of the local mitigation strategy.

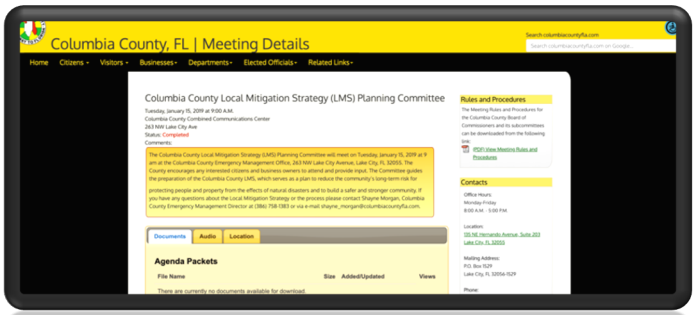
The organization is intended to represent a partnership between the public and private sector of the community, working together to create a disaster resistant community. The proposed mitigation projects developed by the Working Group are listed in this plan in Appendix B. When the projects are implemented, they are intended to make the entire community safer from the impacts of future disasters, and will benefit every individual, neighborhood, business, and institution.

Members of many organizations were invited via e-mail correspondence to discuss the importance of participation on the Columbia County LMS Working Group. Each jurisdiction was represented in the LMS Working Group (see Table 2.1). In addition, the Columbia County LMS Working Group benefited from the assistance and support of its many members.

Participation in the Working Group is not limited in any manner, and all members of the community, whether representing the public or private sector, are welcome to participate. *The general public and neighboring communities are encouraged to become involved with the Columbia County Local Mitigation Strategy* to gauge the plan effectiveness and help identify local hazards to be placed on the county project list. Cooperation from interested parties, including local/adjacent government representatives and citizens, is solicited via public meeting advertisements in the local County newspaper, and other online resources.

There were several opportunities to include the public citizens in the LMS planning:

- LMS Meeting Notices were listed on the County website, Meeting Details:



https://www.columbiacountyfla.com/MeetingDetails.asp?Id=3256&Year=2019&Month=1

- LMS Meeting Notice was advertised on the EM Facebook page:

  https://www.facebook.com/ColumbiaCountyEOC/

- LMS Meeting Notices were published in the Columbia County Observer:

  http://www.columbiacountyobserver.com/

- LMS Meeting Notices were announced at the County Commissioner's meetings.

- A copy of the LMS plan was advertised and available online for comments

There has been public participation from the community as some residents attend the Columbia County LMS meetings as noted on the sign-in sheets in Appendix A. In addition, the press attends every LMS meeting and writes articles on how the community can participate in the mitigation activities for the county's local mitigation strategy.

Public Involvement in the Drafting Stage of the LMS

Public involvement with the LMS is important to document. A copy of the 2020 LMS plan was available online at Emergency Management (EM) website:

https://www.columbiacountyfla.com/EmergencyMgt_911.asp

It provided the County citizens an opportunity to review the document and submit feedback to the EM director "prior to the final plan approval".

There was participation from the County residents in the LMS meetings. In addition, those member organizations listed in Table 2.1 provided a great deal of support and assistance.

The LMS Working Group Chairman is Shayne Morgan, Columbia County Emergency Management and the Vice Chairman is Brandon Stubbs, Columbia County Building and Zoning.

Table 2.1- 2020 Columbia County LMS Working Group Members

Columbia County Emergency Management	Shayne Morgan, Emergency Management Director
Columbia County Building & Zoning	Brandon Stubbs, County Planner
Columbia County Building & Zoning	Liza Williams, Planning Technician
Columbia County Sheriff's Office	Sean Sikes, Sergeant
Columbia County Sheriff's Office	Joe Lucas, Chief Deputy
Columbia County School District	Keith Hatcher, Director of Purchasing & Risk Management

Columbia County School District	Judy Tatem, Safe School Coordinator
Columbia County School District	Brandon Beadles, Coordinator Choice Education
Columbia County Public Works	Chad Williams, Public Works Director
Columbia County Fire Rescue	Jeff Crawford, Fire Chief
Columbia County 911 Addressing	Matt Crews, GIS Coordinator
Columbia County Safety	David Kraus, Assistant County Manager, Administration
City of Lake City	Joe Helfenberger, City Manager
City of Lake City	Thomas Henry, Public Works Director
City of Lake City	Paul Dyal, Executive Director Utilities
Lake City Police Department	Argatha Gilmore, Chief
Lake City Police Department	Gerald Butler, Assistant Chief of Police
Lake City Police Department	Andy Miles, L*ieutenant,* Operations Division
Town of Ft. White	Ronnie Frazier, Mayor
Florida Department of Transportation	Ed Ward, District 2 Emergency Coordination Officer
Florida Forest Service	Doc Bloodworth, Wildfire Mitigation Specialist
Florida Gateway College	Mike McKee, Executive Director, Media & Public Information
Daniel Crapps Agency	Laura Nettles, Realtor
Suwannee River Water Management District	Abby Johnson, Communications Coordinator
Columbia County Citizen	Gary Hamilton
Gilchrist County Emergency Management	Ralph Smith, Emergency Management Director
Suwannee County Emergency Management	Sharon Hingson, Deputy Director
The Management Experts	Traci Buzbee, Owner
The Management Experts	Gail Leek, Emergency Management Planner

LMS Working Group Meetings

Columbia County Emergency Management is the lead agency in scheduling and conducting the efforts of the Local Mitigation Strategy Working Group and is primarily responsible for updating the LMS plan. The LMS meetings were held at the Columbia County Department of Emergency Management office, 263 NW Lake City Avenue, Lake City FL and occurred in 2016; 2017; 2018, and 2019.

See Appendix A for the meeting notices or advertisements, agendas, attendee sign-in sheets and meeting minutes.

Planning Procedures

The procedures used by the Columbia County LMS Working Group is based on the following important concepts:

- Organizes a comprehensive, multi-organizational, multi-jurisdictional planning group that establishes specific goals and objectives to address the community's vulnerabilities to all types of hazards.
- Establishes a planning schedule that allows participants to anticipate their involvement in the technical analysis and evaluations.
- It utilizes a logical, stepwise process of hazard identification, risk evaluation and vulnerability assessment, as well as analysis of past disaster events, that is consistently applied by all participants.
- Mitigation projects are proposed for incorporation into the plan only by those jurisdictions or organizations with the authorities and responsibilities for their implementation.
- The process encourages participants to propose specific mitigation projects that are feasible to implement and clearly directed at reducing specific vulnerabilities to future disasters.
- Proposed mitigation projects are characterized in a substantive manner, suitable for this level of planning, to assure their cost effectiveness and technical merit, as well as coordinated among jurisdictions to assure that conflicts or duplications are avoided.

The planning process begins with the development of the Working Group as an organization and obtaining participation from the local government jurisdictions and key organizations and institutions. The planning work conducted to develop this document relies heavily on the expertise and authorities of the participating agencies and organizations, rather than on detailed scientific or engineering studies. The Working Group is confident that the best judgment of the participating individuals, because of their role in the community, can achieve a level of detail in the analysis that is more than adequate for purposes of local mitigation planning.

Analyzing the need for the community and then formulating proposed mitigation projects to avoid or minimize vulnerability of the community to future disasters is an enormous effort, and an area that must be reviewed and addressed periodically. The goals and objectives set by the Working Group are intended to help focus the effort of the participants, for example, by directing attention to certain types of facilities or neighborhoods, or by emphasizing implementation of selected types of proposed mitigation projects.

The LMS Working Group is responsible for:

- ✓ Official decisions regarding the planning process;
- ✓ Determining the priority and approving the proposed mitigation project for each jurisdiction;
- ✓ Deleting projects that are no longer applicable for implementation; and
- ✓ Coordinating the technical analysis and planning activities.

These activities include conducting the hazard identification and vulnerability assessment processes, as well as receiving and coordinating the mitigation projects for incorporation into this plan.

Hazard Identification and Risk Estimation

The Working Group analyzes the natural hazards that threaten all or portions of the community. Where possible, specific geographic areas subject to the impacts of the identified hazards are delineated. Data is analyzed on previous occurrences for the natural hazards. In addition, the Working Group uses general information to estimate the relative risk of the various hazards as an additional method to focus their analysis and planning efforts. They compare the likelihood or probability that a hazard will impact an area, as well as the consequences of that impact to public health and safety, property, the economy, and the environment. This comparison of the consequences of an event with its probability of occurrence is a measure of the risk posed by that hazard to the community.

Depending on the participating jurisdiction, a variety of information is obtained regarding hazard identification and risk estimation. The planners representing the jurisdiction attempt to incorporate consideration of hazard specific maps, including flood plain delineation maps, whenever applicable, and GIS-based analyses of hazard areas and the locations of critical facilities, infrastructure components and other properties located within the defined hazard areas.

Estimating the relative risk of different hazards is followed by the assessment of the vulnerabilities in the likely areas of impact to the types of physical or operational agents potentially resulting from a hazard event.

Vulnerability Assessment

There are two methods available to the Working Group to assess the communities' vulnerabilities to future disasters.

- The first method is a methodical, qualitative examination of the vulnerabilities of important facilities, systems and neighborhoods to the impacts of future disasters. For the participating jurisdictions and organizations, the individuals most familiar with the facility, system or neighborhood through a guided, objective assessment process established by Working Group, complete the analysis and examination details.

  The process ranks both the hazards to which the facility, system or neighborhood is most vulnerable, as well as the consequences to the community should it be disrupted or damaged by a disaster. This process typically results in identification of specific vulnerabilities that can be addressed by specific mitigation projects that can be proposed and incorporated into this plan.

  As an associated process, the Working Group also reviews past experiences with disasters to see if those events highlighted the need for specific mitigation projects based on the type or location of damage they caused. Again, these experiences can result in the formulation and characterization of specific mitigation projects for incorporation into the plan.

- The second method for assessment of community vulnerabilities involves comparison of the existing policy, program and regulatory framework promulgated by local jurisdictions to control growth, development and facility operations in a manner that minimizes vulnerability to future disasters.

  The Working Group members can assess the individual jurisdictions' existing codes, regulations, plans, and programs to compare their provisions and requirements against the hazards posing the greatest risk to that community. If indicated, the participating jurisdiction can then propose development of additional codes, plans or policies as mitigation projects for incorporation into the Columbia County LMS for future implementation when it is appropriate to do so.

Review & Integration with Existing Plans

The LMS is intended to provide the local communities an opportunity to implement mitigation efforts across all planning documentation. In an attempt to integrate mitigation efforts across both the public and private domain, the LMS Working Group works to incorporate existing planning mechanisms into the LMS and to assure that the LMS is integrated into other mechanisms throughout the county. Many of the LMS Working Group members are also involved in the current update of the County's Comprehensive Plan and brings the LMS goals and objectives to the table of those efforts.

The LMS Working Group consulted, reviewed and analyzed the following documents for review and incorporation into the 2020 LMS:

- ✓ Columbia County Comprehensive Plan
- ✓ Columbia County Land Development Regulations
- ✓ City of Lake City's Comprehensive Plan
- ✓ City of Lake City's Land Development Regulations
- ✓ Town of Ft. White Land Development Code
- ✓ Columbia County Emergency Management Plan
- ✓ Suwanee River Water Management District (SWRMD) Strategic Plan
- ✓ FEMA Flood Insurance Rate Maps (FIRM) and Flood Insurance Study (FIS), effective date: February 4, 2009; revised November 2, 2018

The County currently uses comprehensive and emergency management planning, capital improvement projects, building codes and ordinances to guide and control development throughout the County, and assists the city and town in this respect. The LMS Working Group recognizes the importance of integrating the hazard mitigation strategies identified in the 2020 update into these planning mechanisms.

The County, the City of Lake City, and the Town of White address natural hazards in their comprehensive plan and land use regulations through building codes and specifically through their flood damage prevention ordinances. A summary of mitigation elements in each of the above listed documents is given below; the flood ordinances and FEMA flood maps are briefly discussed below but are presented in more detail in Section 4, flood section of this plan.

The County has incorporated the requirements of the Local Mitigation Strategy into their comprehensive plans and land development regulations. The process for amending local government comprehensive plans is specified by Florida law, Section 163.3 191, Florida Statutes, which requires local governments to prepare Evaluation and Appraisal Reports of their comprehensive plan at least once every seven years. The purpose of the process is to consider changes to comprehensive plans that reflect new information, comprehensive plan successes and failures, changing conditions and trends, as well as changes in state policy on planning and growth management which may have occurred during the prior seven years. The County considered new information and policy guidance provided in the LMS in their next evaluation and appraisal report for amendments to their comprehensive plans.

✓ **Columbia County Comprehensive Plan,** Amended February 15, 2018 by Ordinance No. 17-21

Future Land Use Element
Objectives and Policies for both Urban Development Areas
Policy I.1.6 and **Policy 1.2.2**
Environmentally Sensitive Areas Land Use
Lands classified as Environmentally Sensitive Areas are not preservation areas, or conservation areas, but are lands capable of making a significant contribution to the economy of the County. Agriculture and silviculture activities, conducted in accordance with the silviculture policy contained within the Conservation Element of the Comprehensive Plan are uses which contribute significantly to the County economy and shall be permitted. Land uses permitted within

lands classified as Environmentally Sensitive Areas may be required to provide mitigating measures to protect the natural functions of these areas; Environmentally Sensitive Areas, which are lands within the AE zones of the 100-year flood, as designated by the Federal Emergency Management Agency, Flood Insurance Rate Map, dated February 4, 2009, and located in the Santa Fe River Corridor, Suwannee River Corridor and Olustee Creek Corridor; as well as the Ichetucknee Trace as defined by the Ichetucknee Trace boundary objective contained in the Future Land Use Element, shall conform to the following density: Environmentally Sensitive Areas less than or equal to 1.0 dwelling unit per 10 acres.

Objectives and Policies for both Urban Development Areas and Rural Areas

Policy I.3.7- The County shall participate in the National Flood Insurance Program and regulate development and the installation of utilities in flood hazard areas in conformance with the program's requirements.

Objectives and Policies for both Urban Development Areas and Rural Areas

Policy I.12.1- The County's land development regulations shall contain specific and detailed provisions to manage future growth and development to implement the Comprehensive Plan which shall contain at a minimum the following provisions to: 4. Regulate areas subject to seasonal and periodic flooding and provide for drainage and stormwater management.

Housing Element

Housing Goal, Objectives and Policies

Policy III.1.2- The County shall permit the construction of government subsidized housing only within areas which are served by public facilities which meet or exceed the adopted level of service standards established in the other elements of this Comprehensive Plan. In addition, government subsidized housing shall be prohibited within areas within the 100-year floodplain, as designated by the Federal Emergency Management Agency, Flood Insurance Rate Map.

Conservation Element

Conservation Goal, Objectives and Policies

Policy V.2.6- The County shall require all new development to maintain the natural functions of environmentally sensitive areas, including but not limited to wetlands and 100-year floodplains so that the long term environmental integrity and economic and recreational value of these areas is maintained.

Policy V.2.7- The County shall provide for the regulation of development within the AE zones of the 100-year floodplains of the Santa Fe River, Suwannee River and Olustee Creek; as well as the Ichetucknee Trace as defined in Ichetucknee Trace boundary objective of the Future Land Use Element, by establishing these areas as Environmentally Sensitive in accordance with the land use classification policy contained in the Future Land Use Element of this Comprehensive Plan. In addition, the County shall participate in the National Flood Insurance Program and regulate all development and the installation of utilities in the County within flood hazard areas in conformance with the program requirements. Further, the County shall require all structures in the County to be clustered on the non-floodprone portion of a site. Where the entire site is in a floodprone area, or an insufficient buildable area on the non-floodprone portion of a site exists, all structures located in floodplains shall be elevated no lower than 1 foot above base flood elevation. Non-residential structures located in floodplains may be flood proofed in lieu of being elevated provided that all areas of the structure below the required elevation are watertight. In addition, where the entire site is in a floodprone area or an insufficient buildable area on the non-floodprone portion of site exists, all structures located in areas of shallow flooding shall be elevated at least 2 feet above the highest adjacent grade.

Policy V.2.8- Where the alternative of clustering all structures on the non-wetland portion of the site exists, the County shall conserve wetlands as defined in the environmentally sensitive land policy of the Future Land Use Element of this Comprehensive Plan by prohibiting any development which alters the natural function of wetlands and regulating mining operations, as provided for in the mining policy contained within the Future Land Use Element of this Comprehensive Plan, within wetlands. Mitigation efforts shall be required for activities which alter the natural functions of wetlands in accordance with Chapter 40B-400, Florida Administrative Code, in effect upon the adoption of this policy. Such mitigation shall result in no net loss of wetlands and all restored or created wetlands shall be of the same ecological type, nature and function. Where the alternative of clustering all structures on the non-wetland portion of a site does not exist, the County shall allow only minimal residential development activity in those areas defined as wetlands within

this Comprehensive Plan and such development activity shall conform to the density requirement for the land use classification applicable to the location of the wetland. However, in no case shall residential dwelling unit density be greater than 1 dwelling unit per 5 acres. In addition, such development activity shall comply with the following densities and performance standards. 1. Residences and any support buildings shall be elevated no lower than 1 foot above the highest recorded flood level in the wetland. If flooding data is not available, residences and any support buildings shall be built at least 2 feet above the highest seasonal water level.

✓ Columbia County Land Development Regulations

Article 4 – Zoning Regulations

Section 4.3 Conservation, 4.3.7 and several areas throughout Article 4 reference the details on the minimum feet in the setbacks - Special provisions. The location of any structure (except permitted docks, walkways, and piers) shall be set back a minimum of 35 feet from wetlands. The location of any structure (except permitted docks, walkways, and piers) shall be set back a minimum of 75 feet from the Suwannee, Santa Fe and Ichetucknee Rivers. The location of any structure (except permitted docks, walkways, and piers) shall be set back a minimum of 35 feet from all other perennial rivers, streams and creeks.

Section 4.4 "ESA" environmentally sensitive areas, 4.4.1 - Districts and intent. The "ESA" environmentally sensitive area category includes three zone districts: ESA-1, 2, 3. Lands in these districts are considered in need of special planning and treatment regarding land development regulation. These are not preservation districts, but land uses permitted within these districts are to provide mitigating measures to protect the natural functions of areas which are limited to the planning and treatment of land development within the 100-year floodplain of the Ichetucknee Springs State Park, O'Leno State Park, Osceola National Forest, Pinhook Swamp, Suwannee River Corridor, Santa Fe River Corridor and Ichetucknee Trace, as designated within the Federal Emergency Management [Agency] flood insurance rate map for the county, as amended. These regulations prohibit intensive residential, intensive recreational and intensive agricultural uses and prohibit industrial and commercial development within the 100-year floodplain of the areas designated as environmentally sensitive areas.

Section 4.17 Industrial, 4.17.5 – Special exceptions 2. Bulk storage yards including bulk storage of flammable liquids, subject to provisions of local and state fire codes.

Section 4.18 "PRD" Planned Residential Development. 4.18.6 Procedure for approval of a planned residential development. e. A site analysis map at the same scale as the preliminary development plan described below shall be submitted indicating flood prone areas, areas with slopes greater than five percent, areas of soils which are marginally suited for development purposes and tree cover.

Article 5 – Subdivision Regulations

Section 5.2 Policy, Section 5.2.2.6 Land to be subdivided shall prevent periodic and seasonal flooding by providing adequate protective flood control and drainage facilities.

Section 5.5 Character of the Land Land which the Board of County Commissioners finds to be unsuitable for subdivision development due to flooding, improper drainage, steep slopes, rock formations, adverse earth formations or topography, utility easements, or other features which will reasonably be harmful to the safety, health, and general welfare of the present or future inhabitants of the subdivision and/or its surrounding areas shall not be subdivided or developed unless adequate methods are formulated by the sub divider and approved by the Board of County Commissioners to solve the problems created by the unsuitable land conditions.

Section 5.33.14 Required information on preliminary plat Natural features, including lakes, marshes or swamps, water courses, wooded areas, and land subject to the 100-year flood as defined by the Federal Emergency Management Agency official flood maps.

Section 5.36.7 Location of streams, lakes and swamps, and land subject to the 100-year flood as defined by the Federal Emergency Management Agency. Where no flood elevation is determined the area shall be determined by sub dividers engineer.

Article 7 – Stormwater Management Regulations

Section 7.1 – Relationship to other stormwater management requirements.

Section 7.1.2.General exemptions. The following development activities are exempt from these land development regulations, except that steps to control erosion and sedimentation must be taken for all development and any development exempt from chapter 62 or 40B-4 as cited above which is adjacent to or drains into a surface water, canal, or stream, or which empties into a sinkhole, shall first allow the runoff to enter a grassed swale or other conveyance designed to percolate 80 percent of the runoff from a three year, one hour design storm within seventy-two (72) hours after a storm event. 8. Action taken under emergency conditions to prevent imminent harm or danger to persons, or to protect property from imminent fire, violent storms, hurricanes, or other hazards. A report of the emergency action shall be made to the board of county commissioners and water management district as soon as practicable.

Article 8 – Floodplain Management

Section 8.1 General, Section 8.1.1 Title These regulations shall be known as the Floodplain Management Ordinance of Columbia County, hereinafter referred to as "this ordinance."

Section 8.1.2 Scope The provisions of this ordinance shall apply to all development that is wholly within or partially within any flood hazard area, including but not limited to the subdivision of land; filling, grading, and other site improvements and utility installations; construction, alteration, remodeling, enlargement, improvement, replacement, repair, relocation or demolition of buildings, structures, and facilities that are exempt from the Florida Building Code; placement, installation, or replacement of manufactured homes and manufactured buildings; installation or replacement of tanks; placement of recreational vehicles; installation of swimming pools; and any other development.

Section 8.1.3 Intent. The purposes of this ordinance and the flood load and flood resistant construction requirements of the Florida Building Code are to establish minimum requirements to safeguard the public health, safety, and general welfare and to minimize public and private losses due to flooding through regulation of development in flood hazard areas to: 1.Minimize unnecessary disruption of commerce, access and public service during times of flooding; 2.Require the use of appropriate construction practices in order to prevent or minimize future flood damage; 3.Manage filling, grading, dredging, mining, paving, excavation, drilling operations, storage of equipment or materials, and other development which may increase flood damage or erosion potential; 4.Manage the alteration of flood hazard areas, watercourses, and shorelines to minimize the impact of development on the natural and beneficial functions of the floodplain; 5.Minimize damage to public and private facilities and utilities; 6.Help maintain a stable tax base by providing for the sound use and development of flood hazard areas; 7. Minimize the need for future expenditure of public funds for flood control projects and response to and recovery from flood events; and 8.meet the requirements of the National Flood Insurance Program for community participation as set forth in Title 44 Code of Federal Regulations, Section 59.22.

Article 12 - Appeals, Special Exceptions, Variances and Interpretations

Section 12.3 – Variances, General 12.3.3 Variances to flood damage prevention regulations. The board of county commissioners may permit modifications in the minimum standards of design under the following conditions: 4. In passing upon such variance applications, the board of county commissioners shall consider all technical evaluations, all relevant factors, all standards specified within article 8 of these land development regulations, and:(a)The danger that materials may be swept onto other land to the injury of others; (b)The danger to life and property due to flooding or erosion damage; (c) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner; (d)The importance of the services provided by the proposed facility to the community; (e) The necessity of the facility to a waterfront location, in the case of a functionally dependent facility; (f)The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use; (g)The compatibility of the proposed use with existing and anticipated development, (h) The relationship of the proposed use to the county's comprehensive plan and floodplain management program for the county; (i)The safety of access to the property in times of flood for ordinary and emergency vehicles; (j)The expected heights, velocity, duration, rate of rise and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site, and; (k) The costs of providing governmental services during and

after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges. 6.There is no substantial increase in flood hazard or flood damage potential, if certified by a professional engineer registered in the State of Florida.

✓ City of Lake City Comprehensive Plan

Goal, Objectives and Policies Goal I – In recognition of the importance of enhancing the quality of life in the City, direct development to those areas which have in place, or have agreements to provide, service capacity to accommodate growth in an environmentally acceptable manner.
Objective I.2 The City shall adopt performance standards which regulate the location of land development consistent with topography and soil conditions and the availability of facilities and services.
Policy I.2.1 The City shall restrict development within unsuitable areas due to flooding, improper drainage, steep slopes, rock formations and adverse earth formations by the following design standards for arrangement of development.
Policy I.4.1 The City's land development regulations shall continue to contain specific and detailed provisions to manage future growth and development to implement the Comprehensive Plan which shall contain at a minimum the following provisions to 4. Regulate areas subject to seasonal and periodic flooding and provide for drainage and stormwater management.
Objective I.6 The City shall continue to include within the portion regarding the report and recommendation of the Planning and Zoning Board on amendments to such regulations, that such report shall address whether the proposed amendment will be a deterrent to the improvement or development of adjacent land uses and it shall be concluded by the local governing body, based upon such report and prior to approval of the amendment, that the granting of the amendment will not adversely impact adjacent land uses.
Policy 1.64 The City shall participate in the National Flood Insurance Program and regulate development and the installation of utilities in flood hazard areas in conformance with the programs requirements.
Goal V – Conserve through appropriate use and protection the resources of the City to maintain the integrity of natural functions.
Policy V.2.6 The City shall continue to require all new development to maintain the natural functions of natural flood storage, pollution alternatives, in wetlands and 100- year floodprone areas.
Policy V.2.7 The City shall participate in the National Flood Insurance Program and regulate development and the installation of utilities in flood hazard areas in conformance with the program requirements. Further, the City shall require all structures to be clustered on the non-floodprone portion of a site. Where the entire site is in a floodprone area, or an insufficient buildable area on the non-flood prone portion of a site exists, all structures, located in flood plains, shall be elevated no lower than 1 foot above base flood elevation. Non-residential structures located in floodplains, may be flood proofed in lieu of being elevated provided that all areas of the structure below the required elevation are watertight. In addition, where the entire site is in a floodprone area or an insufficient buildable area on the non- floodprone portion of site exists, all structures, located in areas of shallow flooding shall be elevated at least two feet above the highest adjacent grade.
Policy V.4.5 The City shall address, during the development review process, the mitigation of development activities within environmentally sensitive areas, which include but are not limited to those areas identified as environmentally sensitive areas, on the Future Land Use Plan Map of this Comprehensive Plan to ensure that the possible impacts created by the proposed development activity will not significantly alter the natural functions of these significant natural resources. All new development will maintain the natural functions of environmentally sensitive areas, including but not limited to wetlands and 100-year floodplains so that the long term environmental integrity and economic impact and recreation value of these areas is maintained.
Objective VIII. 4 The City shall maintain an annual capital improvements budgeting process to manage the fiscal resources of the City, so that needed capital improvements, identified within the Comprehensive Plan, are provided for existing and future development and re-development.
Policy VIII. 4.7 The City shall replace or renew community facility plants damaged due to storm surge or flood only where such facility can meet minimum requirements for flood proofing.

✓ City of Lake City Land Development Regulations

Article Five. Subdivision Regulations

Section 5.2 Policy 5.2.2. Land to be subdivided shall 6. Prevent periodic and seasonal flooding by providing adequate protective flood control and drainage facilities.

Article Eight. Flood Damage Prevention Regulations

Section 8.1 Standards for Reducing Flood Hazards in the Area of Special Flood Hazard. The standards in this Article apply to all development within the Areas of Special Flood Hazard as shown on the Federal Emergency Management Agency official flood maps. In all areas of special flood hazard, the following provisions are required 4. New construction and substantial improvements shall be constructed by methods and practices that minimize flood damage.

Section 8.3 Standards for Nonresidential Construction Structures located in all A-zones may be flood-proofed in lieu of being elevated provided that all areas of the structure below the required elevation are watertight with walls substantially impermeable to the passage of water and use structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy.

Section 8.7 Standards for Unnumbered A Zones Located within the A-zone areas of special flood hazard, areas denoted with the letter "A" with no suffix are referred to as "unnumbered A zones". These are areas where special flood hazards exist but where no base flood data has been provided.

Section 8.8 Standards for Areas of Shallow Flooding The following standards apply to areas of shallow flooding located within the area of special flood hazard. 1. The lowest floor of all new construction of and substantial improvements to residential structures shall be elevated above the highest adjacent grade at least as high as the depth number specified in feet on the Flood Insurance Rate Map (at least two (2) feet if no depth number is specified.)

Section 8.13 Special Provisions for Subdivisions An applicant requesting the plat approval of a major or minor subdivision shall be informed by the Land Development Regulations Administrator of the use and condition restrictions contained within this Article and Article 5 of these land development regulations. Lands which lie within any "flood hazard area" as shown on the Federal Emergency Management Agency, official flood maps, shall be subdivided and developed only if 1. All such proposals are consistent with the need to minimize flood damage. 8.All agreements for deed, purchase agreements, leases or other contracts for sale or exchange of lots within an area of special flood hazard and all instruments conveying title to lots within an area of special flood hazard prominently publish the following flood hazard warning in the document: FLOOD HAZARD WARNING This property may be subject to flooding. You should contact the City Land Development Regulation Administrator and obtain the latest information about flood elevations and restrictions before making plans for the use of this property.

Section 8.15 Additional Duties of the Land Development Regulation Administrator related to Flood Insurance and Flood Control. The Land Development Regulation Administrator shall 1. For the purpose of the determination of applicable flood insurance risk premium rates within Zone A on the City's Flood Insurance Rate Map published by the Federal Emergency Management Agency.

Section 11.3 Variances, General Variances to Flood Damage Prevention Regulations 4. In passing upon such variance applications, the City Council shall consider all technical evaluations, all relevant factors, all standards specified within Article 8 of these land development regulations, and a. The danger that materials may be swept onto other land to the injury of others; b.The danger to life and property due to flooding or erosion damage; c.The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner; h.The relationship of the proposed use to the Comprehensive Plan and floodplain management program for the City; i.The safety of access to the property in times of flood for ordinary and emergency vehicles; and k.The costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.

✓ Town of Ft. White Land Development Code

Section 5.05 Floodplain Management - These regulations and the flood load and flood resistant construction requirements of the Florida Building Code are to establish minimum requirements to safeguard the public health, safety, and general welfare and to minimize public and private losses due to flooding through regulation of development in flood hazard areas to: 1. Minimize unnecessary disruption of commerce, access and public service during times of flooding; 2. Require the use of appropriate construction practices in order to prevent or minimize future flood damage; 3. Manage filling, grading, dredging, mining, paving, excavation, drilling operations, storage of equipment or materials, and other development which may increase flood damage or erosion potential; 4. Manage the alteration of flood hazard areas, watercourses, and shorelines to minimize the impact of development on the natural and beneficial functions of the floodplain; 5. Minimize damage to public and private facilities and utilities; 6 Help maintain a stable tax base by providing for the sound use and development of flood hazard areas; 7.Minimize the need for future expenditure of public funds for flood control projects and response to and recovery from flood events; and 8. Meet the requirements of the National Flood Insurance Program for community participation as set forth in the Title 44 Code of Federal Regulations, Section 59.22.

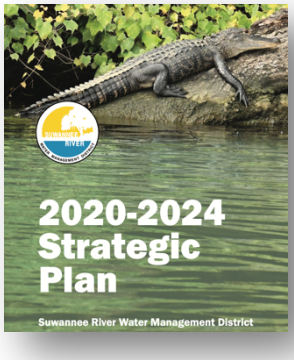
5.05.02 Applicability B. Areas to which this ordinance applies. This ordinance shall apply to all flood hazard areas within the Town of Fort White, as established in subsection 5.05.02.C of these regulations. C. Basis for establishing flood hazard areas. The Flood Insurance Study for Columbia County, Florida, and incorporated areas dated February 4, 2009, and all subsequent amendments and revisions, and the accompanying Flood Insurance Rate Maps (FIRM), and all subsequent amendments and revisions to such maps, are adopted by reference as a part of this ordinance and shall serve as the minimum basis for establishing flood hazard areas. Studies and maps that establish flood hazard areas are on file at the Town of Fort White, 118 SW Wilson Springs Road, Fort White, Florida.

5.05.03 Duties and Powers of the Floodplain Administrator A. Designation. The Town Clerk is designated as the Floodplain Administrator. The Floodplain Administrator may delegate performance of certain duties to other employees. B. General. The Floodplain Administrator is authorized and directed to administer and enforce the provisions of these regulations. The Floodplain Administrator shall have the authority to render interpretations of these regulations consistent with the intent and purpose of these regulations and may establish policies and procedures in order to clarify the application of its provisions. Such interpretations, policies, and procedures shall not have the effect of waiving requirements specifically provided in this ordinance without the granting of a variance. Applications and permits. The Floodplain Administrator, in coordination with other pertinent offices of the community, shall: 1.Review applications and plans to determine whether proposed new development will be located in flood hazard areas; 2. Review applications for modification of any existing development in flood hazard areas for compliance with the requirements of these regulations; 3.Interpret flood hazard area boundaries where such interpretation is necessary to determine the exact location of boundaries; a person contesting the determination shall have the opportunity to appeal the interpretation; 4. Provide available flood elevation and flood hazard information; 5. Determine whether additional flood hazard data shall be obtained from other sources or shall be developed by an applicant; 6. Review applications to determine whether proposed development will be reasonably safe from flooding; 7. Issue floodplain development permits or approvals for development other than buildings and structures that are subject to the Florida Building Code, including buildings, structures and facilities exempt from the Florida Building Code, when compliance with this ordinance is demonstrated, or disapprove the same in the event of noncompliance; and 8. Coordinate with and provide comments to the Building Official to assure that applications, plan reviews, and inspections for buildings and structures in flood hazard areas comply with the applicable provisions of these regulations.

✓ Columbia County Emergency Management Plan (CEMP)

The Columbia County Comprehensive Emergency Management Plan (CEMP), updated in June 2018, was reviewed and referenced in this LMS planning cycle.

✓ Suwannee River Water Management District (SRWMD) Strategic Plan 2020 - 2024



Flood Protection Section

SRWMD works with the FDOT, FDEM, local governments, and landowners to implement regional and local flood protection and flood control projects. Such projects assist local governments to manage, maintain, or expand stormwater infrastructure to better capture runoff, increase stormwater storage, and reduce peak discharge rates.

Also the District provides information to the public to reduce and mitigate flood risks. The District partners with Federal Emergency Management Agency (FEMA) to update floodplain maps to help the public make informed decisions that reduce risk to life and property. Further, SRWMD is the primary source of current flooding information for other agencies and the public, including real-time river levels and rainfall amounts, so that people can make well- informed decisions about flood protection and property at risk.

Through the environmental resource permitting (ERP) Program, the District ensures that development does not result in flooding. Permit reviews are performed to prevent net loss of the 100-year floodplain or increases in flood levels. Permit evaluations also consider specific storm design conditions and potential impacts to upstream and downstream properties. Two Goals are outlined:

Goal One – Reduce and Mitigate Flooding Risks, Strategies include:

- Promote naturally occurring recharge by increasing water storage through hydrologic restoration
- Identify and study 100-year flood elevations of unstudied parcels/areas which are prone to flooding
- Identify unmet flood protection needs of local governments
- Conduct frequent river inspections for unpermitted activities and structures
- Communicate best available data on flood risk to stakeholders

Goal Two – Encourage Non-Structural Flood Plain Management Approaches, Strategies include:

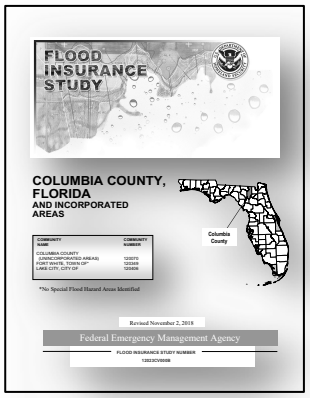
- Maximize land acquisition and/or development restrictions of land within 100-year floodplain
- Seek opportunities and evaluate all land purchases for flood protection potential
- Coordinate with appropriate governmental entities on data sharing and consistency for flood forecasts
- Increase public awareness of flood protection tools, permit requirements, and flood risks
- Strategically partner with stakeholders to identify and implement flood projects
- Coordinate with FDEP to develop a consistent message to evaluate flood risk of single-family homes

SRWMD will measure progress towards the completion of individual and programmatic tasks contained within the aforementioned goals and strategies by tracking the completion of the planning, funding, construction, or implementation phases of the tasks and strategies. Achievements will be measured by the percent of acreage of riverine floodplain under protection; whether the District's cost-share programs have funded at least one flood control project each year; funding opportunities identified for the Dixie County surface water management projects; the acres of hydrologic restoration implemented and maintained, as well as the associated recharge benefits; and the number of compliance cases addressed, and trainings provided.

✓ FEMA Flood Insurance Rate Maps (FIRM) and Flood Insurance Study (FIS), effective date: February 4, 2009; revised November 2, 2018

Revision details on the study:
Initial Countywide FIS Effective Date: February 4, 2009

Revised FIS Effective Date: November 2, 2018 – Add Base Flood Elevations, change zone designations, change Special Flood Hazard Areas, reflect updated topographic information, update map format, add roads and road names, and to incorporate previously issued Letters of Map Amendment and to update corporate limits.



Physical Map Revision (PMR), Effective November 2, 2018:

For this PMR, updated analyses were included for the flooding sources shown in Table 2.2, "Scope of Revision."

Table 2.2 – Scope of Revision for the Columbia County FIS

Flooding Source	Limits of Revised or New Detailed Study
Clay Hole Creek	From approximately 3 miles upstream of Interstate 75 to approximately 2.6 miles downstream of Interstate 75
Deep Creek	From approximately 0.84 miles upstream of US Highway 441 to its confluence with Suwannee River
Falling Creek	From approximately 0.73 miles upstream of Triple Run Road to its confluence with Suwannee River
Falling Creek Tributary	From just upstream of Range Road to its confluence with Falling Creek
Gwen Lake	Drainage area contributing to Gwen Lake
Lake Desoto	Drainage area contributing to Lake Desoto
Lake Harper	Drainage area contributing to Lake Harper
Lake Jeffery	Drainage area contributing to Lake Jeffery
Robinson Creek	From approximately 1.5 miles upstream of US Highway 441 to its confluence with Suwannee River
Unnamed Tributary to Falling Creek Tributary	Drainage area contributing to Unnamed Tributary to Falling Creek Tributary
Watertown Lake	Drainage area contributing to Watertown Lake

Additional information on the FIS is located in Section 5 of the LMS Plan.

Hazard Mitigation Projects

Developing hazard mitigation projects enables the Working Group participants to highlight the most significant vulnerabilities, again to assist in prioritizing subsequent efforts to formulate and characterize specific hazard mitigation projects to eliminate or minimize those vulnerabilities.

Once the highest priorities are defined, the Working Group members can identify specific mitigation projects for the plan that would eliminate or minimize those vulnerabilities. This procedure involves describing the project, relating it to one of the goals and objectives established by the Working Group, and justifying its implementation on the basis of its economic benefits and/or protection of public health and safety, as well as valuable or irreplaceable resources.

The proposed mitigation projects are "prioritized" for implementation in a consistent manner by each participating organization using a set of nine objective criteria.

1) Support Public Health and Safety
2) Protect Lives
3) Protect Property
4) Reduce Future Damage
5) Protect Natural Resources and Environmental Quality
6) Protect Cultural Resources
7) Support Essential Services
8) Support Community LMS and Community Guiding Principles
9) Ensure Regional Benefits

In characterizing a mitigation project for incorporation into the LMS plan, it is important to recognize that the level of analysis conducted by each organization involved has been intentionally designed to be appropriate for this stage in the planning process.

In the interest of the Working Group to have a satisfactory level of confidence that a proposed mitigation project, when it is implemented, will be cost effective, feasible to implement, acceptable to the community, and technically effective in its purpose. To do this, the technical analyses conducted, including the development of a benefit to cost ratio for each proposal, have been based on a straightforward, streamlined approach, relying largely on the informed judgment of experienced local officials.

The analyses have not been specifically designed to meet the known or anticipated requirements of any state or federal funding agency, due largely to the fact that such requirements can vary with the agency and type of proposal. Therefore, at the point when the organization proposing the project is applying for funding from any state or federal agency, or from any other public or private funding source, that organization will then address the specific informational or analytical requirements of the funding agency.

Developing the Local Mitigation Strategy Plan

After the vulnerability assessment has been performed and mitigation projects are identified by the agency or organization developing the proposed mitigation project, the information used to characterize the project is submitted to the Working Group for review and inter-jurisdictional coordination.

The Working Group members assure that the proposal is consistent with the goals and objectives established by each jurisdiction for the planning period. Once the Working Group has reviewed and coordinated the submitted project, it is formally considered for incorporation into the Columbia County LMS. The proposed project is identified as consistent with the goals and objectives for the planning period and would be beneficial for the community as a whole if and when implemented. If so, the Working Group then informally votes to incorporate the proposed project into the strategy.

At the annual or semi-annual LMS meetings, each mitigation project included in the plan is evaluated to determine the following:

- ✓ If the project should remain as a valid and ongoing project (deferred until a later time due to funding);

- ✓ If the project is completed (all details are gathered on the hazard(s) mitigated, mitigation goals achieved, jurisdiction, funding source, total cost to complete the project, agency responsible for implementation, timeline to complete the project, and any specific details relevant to the project;

- ✓ if the project should be removed or deleted from the mitigation project list (LMS plan); and

- ✓ If there are any new projects that should be added to the mitigation project list (LMS plan).

See Appendix B for the details on the ongoing, deferred, completed, deleted or new mitigation projects for Columbia County.

At the end of each planning period, a plan document such as this is prepared for release to the community and for action by the governing bodies of the jurisdictions and organizations that participated in the planning process.

Implementation of Approved Mitigation Projects

Once incorporated into the Columbia County LMS, the agency or organization proposing the project becomes responsible for its' implementation, if feasible, otherwise it could be assigned to another department, if the LMS Working Group vote and all agree. This could be developing a budget for the effort or completing an application to state and federal agencies for financial support for implementation.

Current Status of Participation in the Working Group

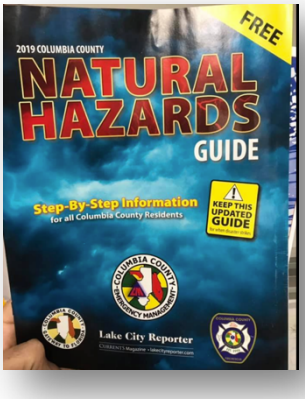
In order to support the participating jurisdictions in the completion of the community profiles and vulnerability assessments, the Working Group sets a schedule for each technical analysis step, provides training in the evaluations needed, and distributes the necessary forms for completion.

The support staff serving the LMS Working Group is from the Columbia County Emergency Management. The staff facilitated the work of the Working Group by advertising the LMS meetings, notifying the members and general public on the upcoming meeting, preparing the meeting agenda, completing the meeting minutes, updating the LMS mitigation project list, keeping documented data on hazard events as they occur, and provide technical assistance as needed.

The participating jurisdictions, organizations, and individuals in the Columbia County LMS Working Group have all worked diligently to complete this plan and will continue to do so *in the future to create a truly disaster resistant community for the benefit of all its citizens.*

Natural Hazards Guide

Columbia County EM is very proactive and dedicated in keeping its citizens of the County informed on natural hazards. Every year, a natural hazards guide was released for the county residents. This free guide provides step-by-step information on the different types of natural hazards that can occur and how to prepare for and respond to the specific hazard event.



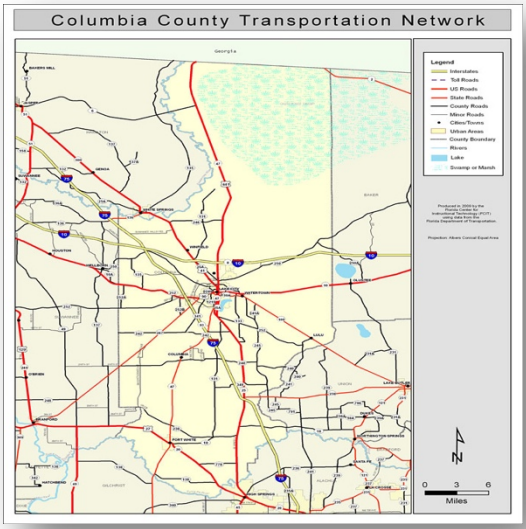
Encouraging public participation in mitigation is a key objective for Columbia County Emergency Management. This guide's goal is to inspire the public to get involved in the LMS Plan and educate and obtain feedback from the citizens on strength and resilience.

Section 3 – Columbia County Profile

The County profile provides an overview on infrastructure - roads, geography, topography, aquifer, geology, agriculture, forest, climate, wildlife, education, demographics, vulnerable populations, mobile home parks, disabled adults, economic profile, rural economic development initiative, and asset inventory.

Infrastructure - Roads

Figure 3.1 – Columbia County Transportation Network



The county is served by Interstates 10 and 75 located in the northwest portion of the County. Lake City and Columbia County are known as "The Gateway to Florida" because I-75 runs though the county, carrying a large percentage of Florida's tourist and commercial traffic. Lake City is the northernmost sizable town/city in Florida on I-75 and the location where I-10 and I-75 intersect. The city relies on travelers for a considerable part of its economy.

Source: http://fcit.usf.edu/florida/maps/pages/12200/f12259/f12259.htm

Geography

Columbia County is located in north-central Florida and is bordered on the north by Clinch and Echols Counties, Georgia; on the south by Alachua and Gilchrist Counties, Florida; on the east by Baker and Union Counties, Florida; and on the west by Suwannee and Hamilton Counties, Florida.

The total square miles for the county are 801 or 513,152 acres with 798 square miles of land or 510,720 acres, and 3.8 square miles of water or 2,432 acres. Approximately 126 square miles or 80,640 acres, approximately 16% of the land area is located within the Osceola National Forest on the eastern side of the County. The Santa Fe River forms the boundary in the south and the Suwannee River forms a boundary on the northwest border of the County.

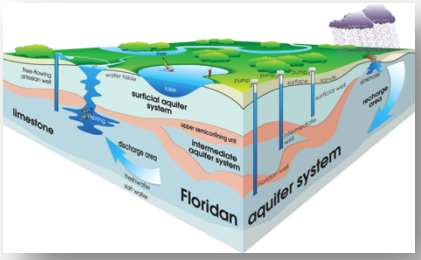
The Town of Ft. White and the City of Lake City (the county seat) are the only two incorporated municipalities in Columbia County. There are several unincorporated areas within the county that house a portion of the population (i.e. Five Points, Watertown, Columbia City, Lulu, Mikesville, and Newco). Since the 2015 plan approval, no new municipalities have been either created or disbanded.

Topography

Columbia County is located in the Gulf Coastal Lowlands physiographic area with topography ranging from 10 feet to about 120 feet above North American Vertical Datum of 1988 (NAVD 88). There are two soil associations abutting the Suwannee River. The Surrency-Portsmouth Association, which is adjacent to the river except in the vicinity of Robinson Creek, consists of nearly level, very poorly drained sandy soils with loamy subsoils and very poorly drained loamy soils, underlain by sand. The next association landward (and adjacent to the river at Robinson Creek) is the Chipley-Albany-Rutledge. This consists of nearly level to gently sloping, moderately well-drained sandy soils and poorly drained sandy soils over loamy subsoil, and very poorly drained sandy soils.

Aquifer

The main source of water for the Columbia County residents is the Floridian Aquifer, one of the most productive sources of ground water in the United States.



https://www.sjrwmd.com/water-supply/aquifer/

Geology

The geology indicates that 2,800 to 3,460 feet of sediments, unconformably overlie structurally high, complex basement rock consisting primarily of marine limestone, some evaporites, and clay. The sediments consists predominately of the porous, marine limestone and form the principal water-bearing formations in the County.

Agriculture

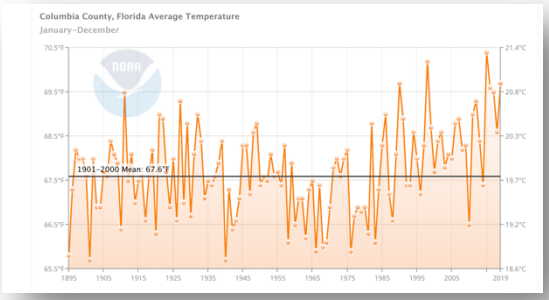
According to the 2017 USDA Census of Agriculture, there are a total of 979 farms in Columbia County. These farms comprise a total of 107,074 acres, approximately 21% of the land in the County. Most of the farming activities consist of mainly harvested cropland 33,561 acres, and livestock, primarily cattle and calves, followed by broilers, sheep and lambs.

Forest or Woodland

As stated by the United States Department of Agriculture, Soil Conservation Service, Soil Survey of Columbia County, Florida, Woodland Management and Productivity, approximately 350,000 acres, or 70% of the County is woodland or forested area. There are three distinct ownership classes, national forest, large corporate holdings, and small privately owned tracts.

Most woodland is managed for needle-leaved trees including slash, longleaf, loblolly and southern bald cypress. The common broad-leaved trees include water, laurel, live oaks, sweetgum, and blackgum. The Oscelola National Forest covers 157,232 acres, of which approximately half is in Columbia County, north and east of Lake City.

Climate



Columbia County is located in the Northern Florida Climatic Zone (NFCZ), which is classified as a hot- humid subtropical region. The average annual temperature in the NFCZ is between 65°F and 70°F. January is the coldest month for the region with an average low of 42°F. The hottest month is July, with an average high of 90°F. Florida is among the wettest states in the United States. Rain falls throughout the year in Lake City, however, the most rain falls during the 31 days centered around June 28, with an average total accumulation of 5.8 inches.

The County's average annual temperature from to the National Centers for Environmental Information (NCEI), National Oceanic and Atmospheric Administration (NOAA), Climate at a Glance, data recorded from 1901 – 2000, recorded the mean temperature for Columbia County is: 67.6°F.

Data source:https://www.ncdc.noaa.gov/cag/county/time-series/FL-023/tavg/12/12/1895-2019?base_prd=true&begbaseyear=1901&endbaseyear=2000

Wildlife

According to the Florida Natural Areas of Inventory (FNAI) details are listed of several types of vertebrate species of fishes, amphibians, reptiles, birds and mammals that are native to Columbia County:

https://www.fnai.org/bioticssearch.cfm

This file is not a comprehensive list of all species and natural communities occurring in the location searched. Only elements documented in the FNAI database are included and occurrences of natural communities are excluded.

Education

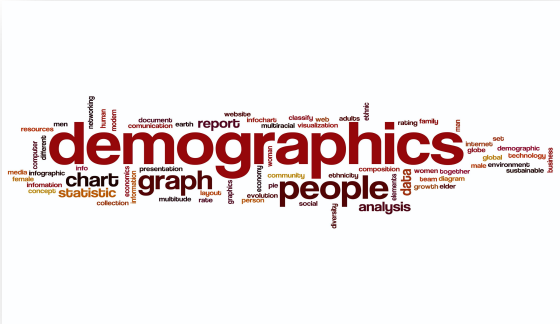
The Columbia County School District (CCSD) currently operates a total of 16 schools: 9 elementary schools, 3 middle schools, 3 high schools, and an alternative school. The CCSD's offices are located in the historic Columbia County High School building, which was constructed in 1921, and is located at 372 West Duval Street, Lake City, FL.

Demographics

Columbia County has seen a slight increase 3.2% in population growth from 2010 to 2018 and is currently ranked 40th out of 67 counties in Florida's population – with 0.3% in the State of Florida. It is important to note that the population figure is an estimate, which is based on other related data or change in this data that was recorded during 2019. A projection on data trends, calculated over a number of years, and is used to forecast or project future levels, based on an assumption that that past trends are unchanged. Details in table 3.1 identify the statistical data of the county population.

Table 3.1– Demographics for Columbia County

Columbia County is the 40th most populous county in the State of Florida



Population		
2018 Estimate – Columbia County		**69,721**
% change 2010 – 2018		3.2%
2019 Estimate		**70,492**
(Inmate Population) – *as of May 2020*		
Correctional Facility and Jails		**876 + xxx**
Correctional Institution (main unit, annex and work camp)		**2282**
Population by Jurisdiction		
Estimate figures as of April 1, 2019		
City of Lake City		**12,271**
2010 Census for Lake City Population	12,046	
Total change 2010 – 2018	1.86%	
Current population figure April 1, 2019	12,271	
Town of Ft. White		**554**
2010 Census for Ft. White Population	567	
Total change 2010 – 2018	-2.5%	
Current population figure April 1, 2019	554	
Unincorporated Columbia County		**57,667**
2010 Census for Unincorporated Columbia County Population	54,918	
Total change 2010 – 2018	4.8%	
Current population figure April 1, 2019	57,687	

Population Growth Estimates and Projections	
2020 Projection based on 2018 estimate	**71,028**
% change 2018- 2020	1.9%
2025 Projection based on 2018 estimate	**73,948**
% change 2020 - 2025	4.1%
Density – Person per Square Mile	
2010	84.7
2019	88.4
Medium Age	
2018	41.1
Population Characteristics	
Language spoken at home other than English	
Persons aged 5 and over	7.2%
Place of birth, foreign born	3.8%
Veteran status, Civilian population 18 and over	13.6%

Sources: Florida Legislature, Office of Economic and Demographic Research, February 2020;
http://edr.state.fl.us/content/area-profiles/county/Columbia.pdf;
Bureau Of Economic and Business Research, https://www.bebr.ufl.edu/population

Data from 2019 reveals nearly 82% of the population lives within the unincorporated areas of Columbia County. The County's only two incorporated areas are the Town of Ft. White (less than 1% of the total county population) and City of Lake City (approximately 17% of the total county population). New population data will be available after the 2020 Census is completed.

Projections of Florida population by county are made by the Florida Bureau of Economic and Business Research (BEBR) each year. These estimates use historical population changes, monthly electric customer data, and the Bureau's analysis of likely future trends. For years after 2010, BEBR developed nine projections for each county using several different techniques. Using these projections, three averages (high, medium, and low) have been calculated. Projections for Columbia County's growth vary dramatically over the course of the next few decades. Table 3.2 displays how the county's growth could grow steadily or slightly decline through 2045 based upon low, medium, or high projections.

Table 3.2 – Projections of Florida Population, Columbia County, 2020 - 2045

Projections of Florida Population by County, 2020–2045, with Estimates for 2018							
County and State	Estimates, April 1, 2018	2020	2025	2030	2035	2040	2045
Columbia	69,721						
Low		68,100	69,000	69,500	69,700	69,400	69,000
Medium		71,000	73,900	76,500	78,600	80,300	81,800
High		73,800	79,100	84,200	89,300	93,700	98,000

Source: https://www.bebr.ufl.edu/sites/default/files/Research%20Reports/projections_2019.pdf

Demographic County Structure

Table 3.3 summarizes the gender and age makeup of Columbia County. According to the U.S. Census Bureau, American Community Survey (ACS) 2018, the median age of the population is 40.7 years. Approximately 50% of the population is male and 50% of the population is female. The age makeup of the county is similar to that of the state with the majority of the population between the ages of 18 and 65.

Table 3.3 Columbia County, ACS Demographic and Housing Estimates, 2018

	Columbia	Percent	Florida	Percent
Total Population	70,503		21,299,325	
Male	35,555	50.4%	10,404,676	48.8%
Female	34,948	49.6%	10,894,649	51.2%
Median Age	40.7		42.2	
Under 5 Years	4,328	6.1%	1,135,392	5.3%
18 Years and Over	55,190	78.3%	17,071,450	80.2%
65 Years and Over	12,978	18.4%	4,358,784	20.5%

Source: U.S. Census Bureau, https://data.census.gov/cedsci/table?q=columbia%20county%20florida&g=0500000US12023&hidePreview=true&tid=ACSDP1Y2018.DP05&vintage=2018&layer=VT_2018_050_00_PY_D1&cid=DP05_0001E

Race and Ethnic Composition

The race and ethnic composition of Columbia County compares similarly to that of the state. Details from the U.S. Census Bureau, American Community Survey (ACS) 2018, total population summary estimates (70,503) are noted in Table 3.4.

Table 3.4 - Population Composition of Columbia County and the State of Florida, ACS Demographic and Housing Estimates, 2018

Race/Ethnicity	Columbia County	Florida
White	77.1%	77.1%
African American	17.7%	17.5%
Hispanic	6%	26.1%
Other Races (i.e. American Indian and Alaska Native, Asian, Native Hawaiian and other Pacific Islander, and/or some other race)	2.3%	8.4%

Source: U.S. Census Bureau, https://data.census.gov/cedsci/profile?g=0500000US12023&tid=ACSDP1Y2018.DP05&hidePreview=true

Vulnerable Populations

While conducting the risk and vulnerability assessment, it is important to recognize community members who may require enhanced mitigation services and considerations. According to the American Journal of Managed Care, vulnerable populations include the economically disadvantaged, racial and ethnic minorities, the uninsured, low-income children, the elderly, the homeless, those with chronic health conditions, including severe mental illness. It may also include rural residents, who often encounter barriers to accessing services available to those in more-dense areas. The vulnerability of these individuals is enhanced by race, ethnicity, age, sex, and factors such as income, insurance coverage (or lack thereof), and absence of a usual source of care. By identifying vulnerable populations and considering

their numbers, diverse needs, and extent of special services, we can begin planning to further protect these populations through the mitigation strategy.

Inmate Population – xxx add jail

As of May 2020, the Columbia Correctional Institution has 2282 inmates in the main unit, annex, and work camp), the Correctional Facility has 876 inmates and the County jail has xxx. The Columbia Correctional Institution has its own emergency planning evacuation mechanisms in place, but it is important to identify the presence of this special inmate population for emergency planning purposes.

Poverty

Current US Census data (2018) on poverty rate in Columbia County was 17.4%. Table 3.5 states statistics from the Office of Economic and Demographic Research notes that 17.3% of Columbia County's population is living in poverty. Another percentage particulars include 26.4% of children under the age of 18 live below the poverty level in Columbia County. The percentages are higher in the county compared to the State figures. Most of these individuals are food stamp recipients, uninsured, and on Medicaid. Those living in poverty are also more likely to be living in vulnerable structures, such as older mobile homes, as well as have increased difficulty in evacuating due to difficulty obtaining adequate means of transportation. This population is also more likely to require shelter provision.

Table 3.5 – Columbia County % in Poverty, 2018

Percent in Poverty, 2018		
	Columbia County	Florida
All ages in poverty	17.3%	13.7%
Under age 18 in poverty	26.4%	20%
Related children ages 5 – 17 in families of poverty	25.7%	18.8%

Sources: Florida Legislature, Office of Economic and Demographic Research, February 2020; http://edr.state.fl.us/Content/area-profiles/county/columbia.pdf

Mobile Home Parks

All counties in the state of Florida are susceptible to hurricane and tropical storm force winds. These high winds are especially damaging to mobile homes, which represent approximately 35% of Columbia County's housing stock, 8,360 (8,190 in unincorporated Columbia County, 112 in the city of Lake City, and 58 in the town of Ft. White). Special consideration in this risk and vulnerability assessment has been paid to this population and details of the structural integrity of these homes are presented in the Residential Construction Inventory and Grading Portion of the LMS.

Table 3.6 – Columbia County Mobile Home and RV Parks and Spaces

Name	Address	City	State	Zip	Mobile Home/RV Space
A Touch of Mink	22127 S US 441 Highway	High Springs	FL	32643	16
Anderson Mobile Home Park	3841 E US 90 Highway	Lake City	FL	32055	10
Tom Bart Mobile Home Park	118 Dreamcatcher Court	Lake City	FL	32024	10

Casey Jones Campground	185 SW Arrowhead Terrace	Lake City	FL	32024	10/117
Cool Breeze Mobile Home Park	181 SW Susan Circle	Lake City	FL	32025	26
Country Acres Mobile Home Park	150 SE Dove Court	Lake City	FL	32025	12
Creekside Mobile Home Park/ Baya	1573 SE Baya Avenue	Lake City	FL	32025	8
Creekside Mobile Home Park / Ridgewood	Ridgewood Avenue	Lake City	FL	32055	17
Jay Davis Rentals 3/Thomas Rd	118 NE Colvin Avenue	Lake City	FL	32055	8
Deer Run Mobile Home Park	464 SW Precision Loop Loop	Lake City	FL	32024	18
Florida Bible Camp	2087 SE Bible Camp Street	High Springs	FL	32643	0/7
Shady Pines	119 SW Shady Lane	Lake City	FL	32024	8
Green Acres Mobile Home Park	179 SW Welch Court	Lake City	FL	32024	14
Oak Harbor	193 NE Michael Place	Lake City	FL	32025	16
Oakview Mobile Home Park	167 Limb Place	Lake City	FL	32025	30
Hopeful Circle Village Mobile Home Park	261 SE Anthony Loop	Lake City	FL	32055	13
Hudson Mobile Home Park	141 NE Ruskin Way	Lake City	FL	32025	7
Ichetucknee Springs Campground (Jug)	245 SW Breckenridge Lane	Fort White	FL	32038	0/18
Jiffy Junction Campground	164 NW Shana Way	Lake City	FL	32055	0/5
J&H Mobile Home Park	220 NW Neptune Court	Lake City	FL	32055	11
Kelly's RV Park	142 NW Kelly Lane	White Springs	FL	32096	14/76
R&J Mobile Home Park	1721 E Duval Street	Lake City	FL	32025	12
Jones Mobile Home Park	180 SW Dukes Drive	Lake City	FL	32024	7
Lake City Campground	4743 N US 441	Lake City	FL	32055	13/69
Lake City RV Park	2463 SW Main Boulevard	Lake City	FL	32025	0/10
Lake Harper Villas Mobile Home Community	410 NW Ridgewood Avenue	Lake City	FL	32055	71
Lakeside Landing	115 SE Lakeside Glen	Lake City	FL	32055	9/3
Lynn's Mobile Home South	183 SE Camelot Loop, Apartment 8	Lake City	FL	32025	26
Cedar Pines Mobile Home Park	198 SE Davie Court	Lake City	FL	32025	46
Martin Oaks Mobile Home Park	8255 SW US HWY 27	Fort White	FL	32038	6
McCall Mobile Home	NE Campus Place	Lake City	FL	32025	8

Park					
Rockwood Mobile Home Park	767 NW Amanda Street	Lake City	FL	32055	18
Milton's Campground 1	12049 N US 441 Highway	Lake City	FL	32055	0/10
Milton's Campground 2	12049 N US 441	Lake City	FL	32055	0/26
Mitchem's Mobile Home Park	167 NW Mitchem Glen	Lake City	FL	32055	9
Mobile Park West	112 NW McCracken Court	Lake City	FL	32024	20
Oaktree Mobile Home Park	248 NW Jupiter Court	Lake City	FL	32055	13
O'Leno State Park	410 SE O'leno Park Road	High Springs	FL	32643	0/62
Pineview Mobile Home Park	106 NW Snoopy Terrace	Lake City	FL	32025	36
Pearce's Mobile Home Park	226 NW Neptune Court	Lake City	FL	32055	13
Paradise Village Estates	195 SE Bikini Drive	Lake City	FL	32025	73
Pinewood Mobile Home Park	108 SW Piston Glen	Lake City	FL	32024	12
Pond View Mobile Home Park	1586 SE Country Club Road	Lake City	FL	32025	62
Ichetucknee Family Grocery & Campground	8587 SW Elim Church Road	Fort White	FL	32038	0/51
Timberlane Mobile Home Park	SW Greenbrier, Sweetbay,Woodberry Court	Lake City	FL	32024	68
Suwannee Valley Resort, LLC	786 NW Stephen Foster Drive	White Springs	FL	32096	0/103
Sunset Landing Mobile Home Par	154 SW Evening Loop	Lake City	FL	32024	21/3
River Rise Resort	252 SE Riverview Circle	High Springs	FL	32643	0/40
Jimmy Williams Mobile Home Park	109 SE Pleasant Court	Lake City	FL	32025	8
Rigsby Rentals - Windhams Mobile Home Park	781 SE Church Avenue	Lake City	FL	32025	19
West Pines Village Mobile Home Park	110 SW Richards Drive	Lake City	FL	32055	14
Water's Village Mobile Home Park	W US HWY 90	Lake City	FL	32055	8/5
Rose Creek Mobile Home Park	220 SE Rose Cove Glen	Lake City	FL	32025	18/10
Sea N Sun LLC	Alfred Markham/ May hall Rd	Lake City	FL	32025	10
Lake City Mobile Home Park	Park Drive	Lake City	FL	32024	14
Buck North Mobile Home Park	402 SE Doe Glen	Lake City	FL	32025	9
Lake City RV Resort, LLC	3864 N US 441 Highway	Lake City	FL	32055	0/67

R & R Mobile Home Park	121 SE Cypress Hollow Glen	Lake City	FL	32025	6
Winfield Mobile Home Park	377 NW Senior Court	Lake City	FL	32055	16
Peaceful Oaks Mobile Home Park	8029 SE CR 242	Lake City	FL	32024	6
Wilkinson industries, Inc Reflection Mobile Home Park	Divider Terrace	Lake City	FL	32024	6
Fiveash Forest	NW Turnberry Dr / Willowbrook Glen	Lake City	FL	32055	51
October Bend RV Park	2960 SE October Road	Lake City	FL	32024	1/14
Lake City Moose Lodge 624	624 NE Williams Road	Lake City	FL	32055	0/24
Maria's Mobile Home Park	312 SE Dynasty Glen	Lake City	FL	32024	6
Alpata Village	4816 N US HWY 441	Lake City	FL	32055	16
Deercreek Mobile Home Park	105 SW Blooming Acres Loop	Lake City	FL	32024	11
Moore Road Mobile Home Park	535 NW Moore Road	Lake City	FL	32055	6
Lakeside Mobile Home Park	204 NE Range Road	Lake City	FL	32024	8
	4426 NW Thunder Street	White Springs	FL	32096	0/31
Our Place Mobile Home Park	23241 S US HWY 441	High Springs	FL	32643	6
White Springs RV Park	2180 NW Thunder Street	White Springs	FL	32096	0/7
Alpata Village II	NW Kenny Court	Lake City	FL	32055	8
Hill Circle Mobile Home Park	134 NW Helen Court	Lake City	FL	32055	
Gonzalez Estate	566 NW Yates Loop	Lake City	FL	32055	6
Cannon Creek Mobile Home Park	180 SW Dukes Drive	Lake City	FL	32024	56
Heritage Way Mobile Home Park	173 SE Shady Oaks Loop	Lake City	FL	32025	8
Hideaway Mobile Home Park	136 SE Joiner Court	Lake City	FL	32055	9
Shady Oaks Mobile Home Park 1	119 SW Joyful Loop	Lake City	FL	32024	13
Moonshine Acres RV Park	10089 SW US HWY 27	Fort White	FL	32038	0/41
Total Number of Mobile Home/RV Spaces					**1,929**

Source: http://www.floridahealth.gov/environmental-health/mobile-home-parks/index.html

Disabled Adults

Disabled adults are those who are limited in any way in any daily activities because of physical, mental or emotional health problems. According to the U.S. Census Bureau, American Community Survey (ACS) 2018 states that who are

limited in any way in any activities because of physical, mental or emotional problems. These populations may require special consideration when planning for disasters, whether it is assistance evacuating in times of disaster or early notification of extreme weather when possible. Planning for these groups will require careful coordination and communication with Columbia County Emergency Management.

Table 3.7 – Disabled Residents for Columbia County Residents, 2018

Disability Population, ACS 2018		
	Columbia County	Percent
Disability Population	13,475	19.5%
Hearing difficulty	4,146	6%
Vision difficulty	2,695	3.9%
Cognitive difficulty	5,735	8.3%
Ambulatory difficulty	7,947	11.5%
Self-care difficulty	2,556	3.7%
Independent living difficulty	5,667	8.2%

Source: https://data.census.gov/cedsci/profile?q=Columbia%20County,%20Florida&g=0500000US12023&tid=ACSDP1Y2018.DP05

Economic Profile

The economic data was collected for Columbia County from the Office of Economic and Demographic Research which analyzes data from population, housing, employment, the labor force, income and financial health, quality of life, revenue and expenditures, state infrastructure and state and local taxation. The figures were updated as of February 2020.

Table 3.8 – Economic Profile for Columbia County

Unemployment Data	
Unemployment Rate, 2018 in Columbia County	3.7%, a slightly higher than average figure than the State of Florida @ 3.6%

Labor Force as Percent of Population	
Aged 18 or Older, Columbia County, 2018	54%

Employment by Industry		
Number of Establishments, 2018 preliminary in Columbia County		**Percent of All Establishments, 2018 preliminary in Columbia County**
All Industries	14,612	14,612
Natural Resource & Mining	100	0.7%
Construction	2,143	14.7%
Manufacturing	313	2.1%
Trade, Transportation and Utilities	2,365	16.2%
Information	182	1.2%
Financial Activities	1,953	13.4%
Professional & Business Services	3,460	23.7%
Education & Health Services	1,287	8.8%
Leisure and Hospitality	1,199	8.2%
Other Services	1,315	9%
Government	85	0.6%

Average Annual Wages		
Average Annual Employment, % of All Industries, 2018 preliminary		**Average Annual Wages, 2018 preliminary**
All Industries	24,226	$38,204
Resource & Mining	0.7%	$40,259
Construction	4%	$36,342
Manufacturing	8.8%	$49,853
Trade, Transportation and Utilities	21.2%	$35,564
Information	0.5%	$63,475
Financial Activities	2.5%	$57,318
Professional & Business Services	11.4%	$33,421
Education & Health Services	14.1%	$40,596
Leisure and Hospitality	12.6%	$16,817
Other Services	2%	$23,287
Government	22.1%	$48,128

Income and Financial Health	
Per Capita Personal Income	
2017; % change 2016 – 2017	$33,658; 3.9%
2018; % change 2017 – 2018	$35,074; 4.2%
Median Income	
Median Household Income	$44,491
Median Family Income	$58,617

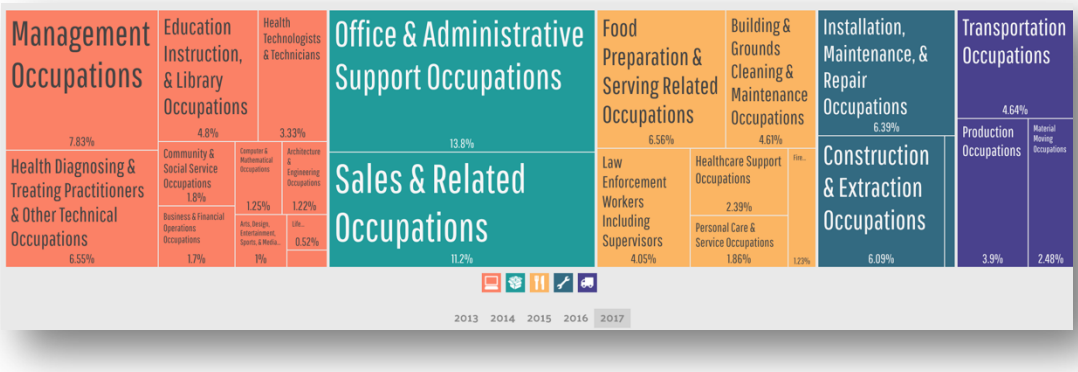
Percent in Poverty, 2018	
All ages in poverty	17.3%
Under age 18 in poverty	26.4%
Related children age 5 – 17 in families in poverty	25.7%

Sources: Florida Legislature, Office of Economic and Demographic Research, February 2020; http://edr.state.fl.us/Content/area-profiles/county/columbia.pdf

Details from the Data USA *(a platform that converts US government data into knowledge)*

From 2016 to 2017, employment in Columbia County grew at a rate of 2.45%, from 25,300 to 25,900 employees. The most common job groups, by number of people living in Columbia County, FL, are Office & Administrative Support Occupations (3,576 people; 13.8%), Sales & Related Occupations (2,902 people; 11.2%), Management Occupations (2,029 people; 7.83%), and Health Diagnosing & Treating Practitioners & Other Technical Occupations (6.55%). Figure 3.2 illustrates the share breakdown of the primary jobs held by residents of Columbia County, FL.

Figure 3.2 – Employment by Occupations



Source: https://datausa.io/profile/geo/columbia-county-fl/; Census, ACS 5-year estimates

Rural Economic Development Initiative (REDI)

Established under the Rural Economic Development Initiative (REDI) by F.S. 288.0656, Rural Areas of Opportunity (RAO) previously referred to as Rural Areas of Critical Concern (RACEC) are communities that have been adversely affected by natural disasters or extraordinary events. Columbia County is a part of the North Central Rural Areas of Opportunity (RAO) (re-designated by Executive Order 15-133) and is comprised of nine counties and (all communities within the county) and one city in Northwest Florida.

REDI provides the following programs and services for rural areas:

- Responds to specific community needs and requests;
- Works with communities to improve their rural economies;
- Assists communities in improving access to housing, health care and educational opportunities;
- Recommends waivers of provisions of economic development programs on a project-by-project basis;
- Undertakes advocacy, outreach and capacity building to improve conditions in rural communities;
- Provides direct access and referrals to appropriate state agencies, as well as county and city associations; and
- Reviews and evaluates the impact of statutes and rules on rural communities and works to minimize adverse impact.

Asset Inventory

The asset inventory provides an outline of resources in the community that can be affected by a hazard event. The inventory is as follows:

- ✓ Building Inventory
- ✓ Critical Facilities

Building Inventory

The LMS Working Group requested information from the property appraiser's office on the building inventory by occupancy type for each jurisdiction. According to the Columbia County Property Appraisers office (May 2020), there are 25,776 buildings and/or structures throughout the County. Table 3.9 provides the type and number of structures for unincorporated Columbia County, the City of Lake City, and the Town of Ft. White.

Table 3.9 – Total Number of Structures in Columbia County

Type of Structure	County (Unincorporated)	City of Lake City	Town of Ft. White
Single Family Residential	11,693	3,091	174
Multi-Family Residential	171	346	2
Mobile Homes	8,190	112	58
Agricultural			
Commercial and Industrial	734	718	51
Government	86	69	9
Institutional	159	103	10
Total	21,033	4,439	304

Source: Columbia County Property Appraiser, May 2020

Real Property Just Value

As stated by the Department of Revenue Property Tax Oversight, 01/2018, the total Just Value of the real property parcels, tangible personal property and railroad and private carlines and value information for the County is: $4,579,759,493. The "just value" is the fair value of property for tax purposes. Data was extracted from Figure 3.4 – Columbia County Property Tax Overview report.

Table 3.10 – 2018 Parcel Count and Total Just Value of the Real Property in Columbia County

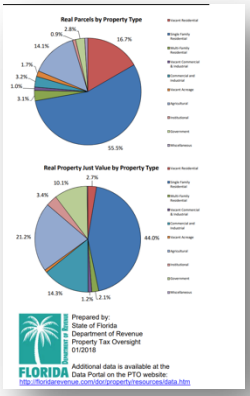
Property Type	# of Parcels	Just Value - Real Property
Single Family Residential	20,276	$1,836,916,972
Multi-Family Residential	1,138	$88,121,772
Vacant Residential	6,087	$111,871,116
Agricultural	5,138	$883,910,801
Vacant Acreage	623	$34,712,191
Commercial and Industrial	1,175	$597,141,737
Vacant Commercial and Industrial	379	$49,372,592

Government	1,005	$422,436,555
Institutional	344	$144,102,760
Miscellaneous	341	$8,642,601
Total # of Parcels	**36,506**	
Total Just Value of Real Property		**$4,177,229,097**

Source: State of Florida, Department of Revenue Property Tax Oversight, 01/2018

Figure 3.3 – Just Value – Real Parcels and Real Property

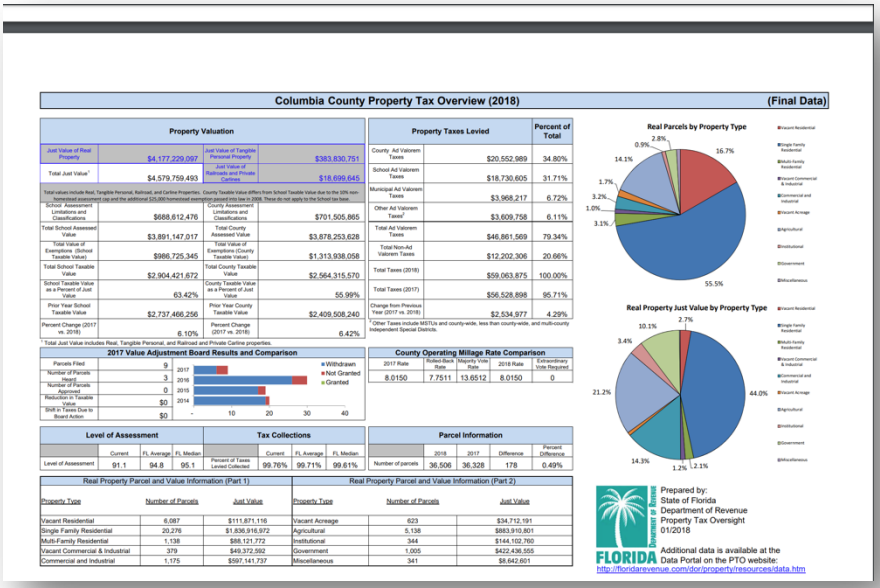
The just value is the fair market value of property for tax purposes. It describes the full cash or market value of property and is the price at which the property would most likely sell. As noted from Figure 3.4, the total Just Value of the real property (*only*) parcel data for Columbia County was: $4,177,229,097



The tangible personal property is all goods, property other than real estate, and other articles of value that the owner can physically possess and has intrinsic value. Inventory, household goods, and some vehicular items are excluded. As stated from Figure 3.4, the total Just Value for the tangible personal property (*only*) was: $383,830,751

The total Just Value for real, the tangible property, and railroads and private carlines was: $4,579,759,493

Figure 3.4 - Columbia County Property Tax Overview (2018)



Determining Taxable Value (Real Property = land and buildings)

The market value, assessed value and taxable value of your house are often nothing alike. The market value is what your house would sell for in the current market. The assessed value is what your county tax assessor reports the house is worth for purposes of calculating your property tax bill. The taxable value is the figure you actually pay tax on.

Formula for Just Value	Just Value (Market Value)
	< - > Assessment Differential (i.e. Save our homes)
	= Assessed Value
	< - > Exemptions
	= Taxable Value

According to the Property Appraisers office, May 2020, the 2019 just value of the real property and parcel count for Columbia County are classified in Table 3.11. This latest figures will be used.

Table 3.11 – 2019 Parcel Count and Total Just Value of the Real Property in Columbia County

Property Type	# of Parcels	Just Value - Real Property
Single Family Residential	20,450	$2,039,413,228
Multi-Family Residential	1232	$93,022,749
Vacant Residential	5826	$107,717,683
Agricultural	5208	$916,395,984
Vacant Acreage	595	$30,450,688
Commercial and Industrial	1179	$600,942,017
Vacant Commercial and Industrial	378	$50,188,817
Government	1009	$421,561,687
Institutional	351	$152,567,691
Miscellaneous	358	$13,156,229
Total # of Parcels	**36,586**	
Total Just Value of Real Property		**$4,425,416,773**

Source: Columbia County Property Appraiser, May 2020

The current "just value of the real property" parcel data for Columbia County is: $4,425,416,773 (an increase of $248,187,676 from 2018 to 2019). The 2019 total just value for real, tangible personal property, and railroads and private carlines was not available, only the real property total figure.

Critical Facilities

The Association of State Floodplain Managers defines a critical facility as those that are essential to community's ability to respond quickly and efficiently to hazard occurrences, recover from and rebuild after hazard occurrences, and meet the needs of its citizens. The critical facilities listed below are those the County has determined are critical to the

maintenance of the health, safety and welfare of its residents, and are necessary to help the County respond to and recover from a disaster. These critical facilities should be given special consideration when bearing in mind the threat of a hazard.

The Columbia County Emergency Management reviews, updates and maintains the critical facility list for accuracy. Updated information was made to the list including name changes and removal of selected facilities. The complete list of the critical facilities with full address, coordinates and other relevant information is submitted to Florida Division of Emergency Management according to the Florida Administrative Code (FAC) 27P-22.005 on an annual basis.

Critical Facilities are defined for the purpose of the LMS plan are those facilities essential to the preservation of life and property during a hazard event and or those facilities critical to the continuity of government as well as those necessary to ensure timely recovery. They are essential to the maintenance of health, safety and welfare of the county residents. Table 3.12 identifies the facilities that provide essential services for the community.

Table 3.12 – Critical Facilities for Columbia County

Facilities	Count
Emergency Operations Center	1
Sheriff's Offices	1 (*City of Lake City*); 1 (*Town of Ft. White*)
County Jail/Prisons	1 County Jail; 2 Prisons
Sheriff's Office Dispatch Center	1
Police Departments	Includes City Police and Fire Department Dispatch
Emergency Medical Services	1 main station. Units also collocated with specific Fire Rescue locations. (Privately operated on the county's behalf)
Fire Departments/Stations	12 (*including the City of Lake City*)
Wastewater Treatment Plant	1
Water Treatment Plants	2
Lift Stations	35
Solid Waste Center	1
Water Well/Water Tank	1
Radio and Communication Towers	20
County Health Departments	1 (*City of Lake City*); 1 (*Town of Ft. White*)
Medical, Health, Rehab and Kidney Centers	5

Nursing Centers	15
Public Schools	14
City Halls	1 (*City of Lake City*); 1 (*Town of Ft. White*)
Community Centers	8
Point of Distribution Centers	2
Disaster Recovery Centers (Mobile and Fixed)	1
Logistics	2 locations identified as County Staging Areas
Shelters (Special Needs, General and Risk)	1 Special Needs Shelter; 21 General Population Shelters; and 3 Risk Shelters. Certain parts of other facilities can be utilized for risk sheltering.

Source: Columbia County Emergency Management

All of the critical facilities identified in Table 3.12 will remain open during times of a disaster excluding the following: public schools and community centers (not designated as a shelter); and the city halls.

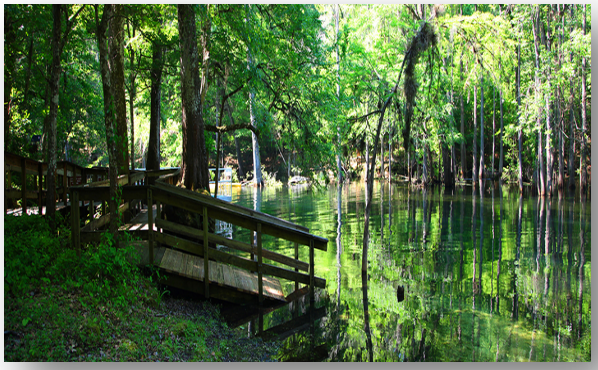
These critical facilities require mitigation project funding. The Hazard Mitigation Grant Program (HMGP), which funds hazard mitigation projects after a declared disaster, will consider the value of the critical facilities' service to the community as a benefit when calculating the benefit-cost ratio for a proposed project.

Section 4 – Hazard Risk and Vulnerability Assessment

Requirements:

§201.6 (c) (2) (i) - Does the Plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction.

§201.6 (c) (2) (ii) – Is there a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans must also address NFIP insured structures that have been repetitively damaged by floods.



This section of the Columbia County Local Mitigation Strategy summarizes the results of the hazard identification and vulnerability assessment processes undertaken by the LMS Working Group members. The intent of this section is to provide a summary compilation of the information gathered and the judgments made about the hazards threatening Columbia County, and the potential vulnerability to those hazards. This assessment will allow County officials and residents to make fully informed decisions as to what types of natural hazards threatens them, how severe the threat is, and the priority to which they should mitigate those threats.

The risk and vulnerability assessment reflects an effort to analyze and record hazard occurrences that have occurred over the past five years. As described in the last plan update, many of the hazards discussed in this section are relevant to Columbia County and the participating jurisdictions, selected natural hazards are not listed due to the geographic location and characteristics of the planning area (i.e. dam levee failure, landslides, earthquakes and tsunamis). In addition, after discussion it was determined that erosion which was profiled in the last plan would be removed for this 2020 LMS Plan update.

The risk and vulnerability assessment identifies the characteristics and potential consequences of hazards within the natural environment that may threaten life and property within the Columbia County. Through the information presented in the county profile and this evaluation section, the county will be able to determine mitigation strategies and prioritize mitigation projects.

The hazard analysis includes a profile of each hazard which identifies county assets vulnerable to each hazard and is a multijurisdictional assessment. This risk assessment for Columbia County meets the all requirements of 44 CFR § 201, as follows:

A community's vulnerability to a specific hazard must be coupled with critical factors to perform a risk assessment. By understanding the risk and vulnerability related to a specific hazard, the community can effectively plan mitigation projects and allocate limited financial resources. Additionally, the community can identify the highest priority hazards and focus mitigation strategies to those hazards with the highest risk of occurrence.

Risk, or the probability of loss, depends on three factors:

- ✓ Frequency – How frequent does a known hazard produce an impact within the community.
- ✓ Vulnerability – How vulnerable is a community to the impact produced by a known hazard.
- ✓ Exposure – What is the community's exposure in terms of life and property to the impact produced by a specific hazard.

Once these three factors are established, the risk level faced by a community with regard to any specific hazard can be calculated using the Risk Triangle Approach.

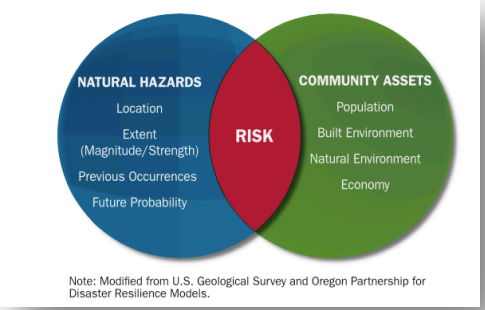
In this approach, the three factors are characterized as the sides of a triangle, and the risk or probability of loss is represented by the triangle's area. If a community wishes to reduce the risk of a specific hazard any of the three factors may be addressed. Mitigation measures applied to any of the three factors can reduce the potential for loss or risk of impacts for any given hazard.

There is very little that can be done to change the frequency of impacts produced by natural hazards. Mitigation planning relative to those hazards must therefore focus on reducing the community's vulnerability or exposure. In terms of technological and societal hazards, the most cost-effective type of mitigation is to limit or reduce the frequency with which such hazards actually occur.

All municipalities in the county are susceptible to the hazards identified therefore the risk assessment was conducted on a countywide basis. Although all communities are susceptible to the identified hazards, the magnitude of those hazards and related disasters can differ.

Natural Hazard Risk and Vulnerability

The important goal for the Working Group members is to maintain a strong, ever-evolving county-wide, multi-hazard mitigation strategy and on a frequent bases evaluate the current and future hazards the county faces and assess the potential vulnerability from each of these hazards.



Note: Modified from U.S. Geological Survey and Oregon Partnership for Disaster Resilience Models.

Periodically analysis occurs of any new information and reassessment the County's vulnerability to each of these threats. This assessment will allow county officials and residents to make fully informed decisions as to the scope of the natural hazards, how severe the threat can be, and the priority to which they should mitigate those threats.

The 2020 Hazard Identification and Vulnerability Assessment represents an effort to continually document hazard occurrences and incorporate relevant, new data. Each hazard addressed in this assessment presents Columbia County with different challenges and opportunities. Some disasters are more likely than others, and some will impact certain residents more than others.

Each natural hazard profile is summarized into the following sections:

1. Hazard Overview
2. Geographic Area
3. Historical Occurrences
4. Probability
5. Risk and Vulnerability Assessment
6. Impact, and
7. Extent

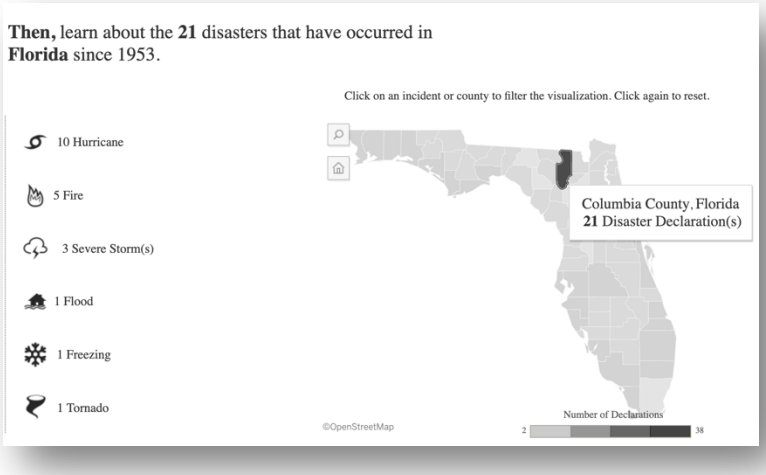
Disaster Declarations

When a disaster strikes that overwhelms the ability of local communities to respond, the President's action authorizes the Department of Homeland Security, Federal Emergency Management Agency (FEMA), to coordinate all disaster relief efforts which have the purpose of alleviating the hardship and suffering caused by the emergency on the local population, and to provide appropriate assistance for required emergency measures, authorized under Title V of the Stafford Act, to save lives and to protect property and public health and safety and to lessen or avert the threat of a catastrophe in the county.

One of the factors associated with risk is the frequency in which the hazard occurs. To understand the risk level and character associated with hazards, the number and type of presidentially declared disasters are recorded below. Columbia County has been impacted by a number of disasters, many of the most significant being hurricanes, tropical storms, wildfires and severe storms. Flooding, freezing and tornado events have also occurred. Many of these incidents have resulted in levels of damage that qualified for federal assistance as the county. Therefore, it is very beneficial to review past major disaster declarations that have impacted the County in preparation for analysis. Since 1953, Columbia County has received 21 presidential disaster declarations for hurricanes, floods, severe storms, wildfires, a freeze and a tornado. Less damaging events that do not call for a presidential declaration are sometimes issued federal, state, or local emergency declarations.

Figure 4.1 discloses that the County experienced over 10 hurricanes, 5 wildfires, 3 severe storms, 1 flood, 1 freeze and 1 tornado event that resulted in a disaster declarations.

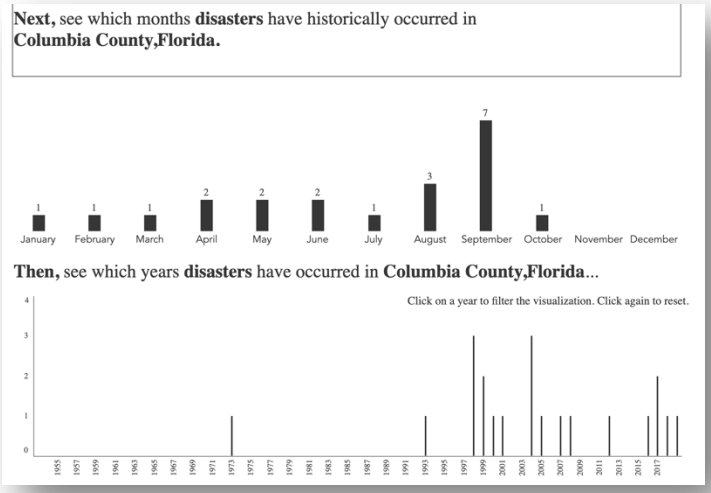
Figure 4.1 – 21 Disasters Types in Columbia County



Source: https://www.fema.gov/data-visualization-disaster-declarations-states-and-counties

Figure 4.2 displays that the most disasters have occurred in the County in the month of September.

Figure 4.2 – 28 Disasters Month and Years in Columbia County



Source: https://www.fema.gov/data-visualization-disaster-declarations-states-and-counties

Based on the summary data in Figures 4.1 – 4.2, table 4.1 provides a list of disaster declarations for the County providing date of incident, disaster event, incident type, declaration # and what type of assistance the County required (i.e. Individual Assistance (IA) or Public Assistance (PA); or both) from 1/1/1985 – 4/20/20. The data reveals that there were 18 disaster declarations in the time period.

Table 4.1 – Columbia County Disaster Declarations (1/1/1985 – 4/20/20)

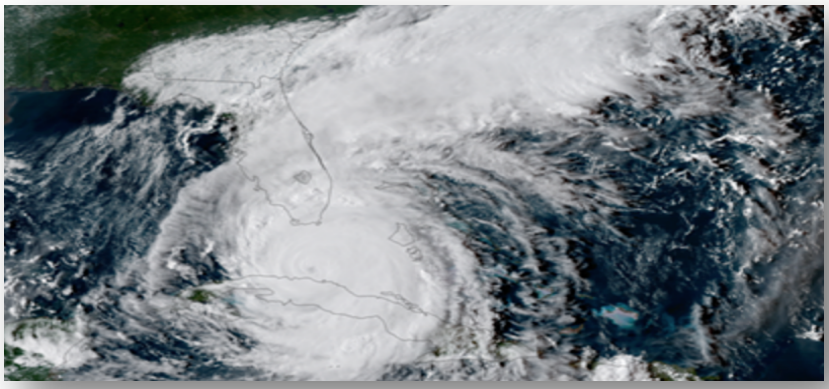


Photo – Hurricane Irma; NOAA

IA, PA or both	Date – Incident Period	Disaster Event	Incident Type	Declaration #
IA,PA	March 12 - 16, 1993	Tornadoes, Flooding, High Winds & Tides, Freezing	Tornado	982

IA, PA	December 25, 1997 – April 24, 1998	Severe Storms, High Winds, Tornadoes, And Flooding	Severe Storm(s)	1195
PA	September 25 – October 7, 1998	Hurricane Georges	Hurricane	1249
IA, PA	May 25 - July 22,1998	Fires	Fire	1223
PA	April 15 – May 25,1999	Fires	Fire	3139
PA	June 5, 2000	Fire	Fire	2306
N/A	December 1, 2000 – January 25, 2001	Freeze	Freeze	1359
PA	August 11 - 30, 2004	Hurricane Charley and Tropical Storm Bonnie	Hurricane	1539
IA, PA	September 3 – October 8, 2004	Hurricane Frances	Hurricane	1545
IA, PA	September 24 – November 17, 2004	Hurricane Jeanne	Hurricane	1561
PA	August 29 – October 1, 2005	Hurricane Katrina Evacuation	Hurricane	3220
PA	May 7, 2007	Fire	Fire	2689
PA	August 18 – September 12, 2008	Tropical Storm Fay	Severe Storm(s)	3288
IA, PA	June 23 – July 26, 2012	Tropical Storm Debby	Severe Storm(s)	4068
PA	August 31 – September 11, 2016	Hurricane Hermine	Hurricane	4280
IA, PA	September 4 – October 18, 2017	Hurricane Irma	Hurricane	4337
PA	September 4 – October 18, 2017	Hurricane Irma	Hurricane	3385
PA	October 7 – October 19, 2018	Hurricane Michael	Hurricane	3405
PA	August 28 – September 9, 2019	Hurricane Dorian	Hurricane	3419
PA	January 20, 2020 – Continuing	Florida Covid – 19	Pandemic	3432
IA, PA	January 20, 2020 – Continuing	Florida Covid – 19	Pandemic	4486

Source: Federal Emergency Management Agency; https://www.fema.gov/disasters?field_dv2_state_territory_tribal_value_selective=FL&field_dv2_incident_type_tid=All&field_dv2_declaration_type_value=All&field_dv2_incident_begin_value%5Bvalue%5D%5Bmonth%5D=1&field_dv2_incident_begin_value%5Bvalue%5D%5Byear%5D=1985&field_dv2_incident_end_value%5Bvalue%5D%5Bmonth%5D=11&field_dv2_incident_end_value%5Bvalue%5D%5Byear%5D=201

The Natural Hazards profiled are as follows:

Table 4.2 – Natural Hazards Profiled for Columbia County

Natural Hazards – Columbia County
Flooding
Sinkholes
Hurricanes/Tropical Storms
Tornadoes

Thunderstorms/Strong Winds, Hailstorms, and Lightning
Riverine Erosion
Wildfires
Drought/Heat Wave
Winter Storms/Freezing Temperatures

Hazard Identification

The information contained in this assessment was identified by using both primary and secondary research materials which includes, but is not limited to, reports from local, state, and national agencies, state and local weather records, the LMS working group members, key local stakeholders, and discussion with residents in Columbia County.

Dataset information was obtained from the GIS Technical Department at Florida Division of Emergency Management (FDEM). Parcel data was compiled from the Florida Department of Revenue and building count and value data was from the Columbia County Property Appraiser's Office.

Each hazard analysis includes the possible severity and magnitude, as well as the potential impact of damage within the County from future hazards. After careful deliberation, the Local Mitigation Strategy Working Group developed (and subsequently assigned) the following 4 levels of measurement to determine the probability that future events will affect the incorporated and unincorporated areas of Columbia County. This method has been retained for the 2020 update, and the probability and magnitude of future hazard events has not changed.

Probability

The probability of a hazard's occurrence is rated minimum through high as outlined below. Each hazard's probability was determined and updated by the Working Group after careful analysis and evaluation. The probability or "chance of occurrence" is defined using an ordinal scale. The scale is as follows:

- ✓ Minimum: Less than one event in a five-year period
- ✓ Low: One to two events in a five-year period
- ✓ Moderate: Three to five events in a five-year period
- ✓ High: An average of one or more events per year in a five-year period

Extent or Magnitude

The extent of a hazard's impact in a worst-case-scenario instance of the hazard is represented in summary sections after each natural hazard.

- ✓ Minor: Any disaster that is likely to be within the response capabilities of local government and results in only minimal need for state or federal assistance.

- ✓ Major: Any disaster that will likely exceed local capabilities and require a broad range of state and federal assistance. FEMA will be informed and notified for federal assistance. The status of the disaster will be predominantly recovery-oriented.

- ✓ Catastrophic: Any disaster that will require massive state and federal assistance, including immediate military involvement. Federal assistance will involve response as well as recovery needs.

The statements are based on the range of magnitude or severity that the county could experience or has experienced using a scientific scale or a quantitative measurement.

Types of scientific scales:
- Enhanced Fujita Scale for tornadoes
- Saffir-Simpson Hurricane Wind Scale for hurricanes/tropical storms/winds
- Keetch-Byram Drought Index for droughts
- Heat Index Chart for heat-related occurrences

Quantitative measurements
Quantitative measurements based on historical occurrences recorded from the following sources: Suwannee River Water Management District (SRWMD); the National Climatic Data Center (NCDC), National Oceanic and Atmospheric Administration (NOAA); the National Weather Service (NWS), the Columbia County and incorporated areas Flood Insurance Study (FIS); the Florida Climate Center, the Florida Forest Service, Federal Emergency Management Agency (FEMA), the US Department of Agriculture, and the Columbia County Department of Emergency Management.

The measurements are:
- Flood depth for floods
- Length, width and height for sinkhole measurement (if available)
- Acres burned for wildfires
- High, medium or low based on the previous event occurrences

Vulnerability Assessment

Columbia County has many assets at risk from hazards. The most important risk are injuries to the people or the citizens within the County. Hazard events that could cause significant injuries should be highlighted to ensure that appropriate emergency plans with specific guidelines and response mechanisms are in place. Property includes buildings, critical facilities and infrastructure are other physical assets that could be at risk.

In conducting the risk assessment, evaluate the vulnerabilities that would make an asset more susceptible to damage from a hazard. Examples of types of vulnerabilities could include deficiencies in building construction, process systems, security, protection systems and loss prevention programs which could contribute to the severity of damage when an incident occurs.

An assessment of each of the jurisdictions risk is essential to determine where they vary from the risks facing the entire community. And, estimating potential dollar losses to vulnerable structures, if available. For future planning, Columbia County will continue to evaluate and update the vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas.

Frequency

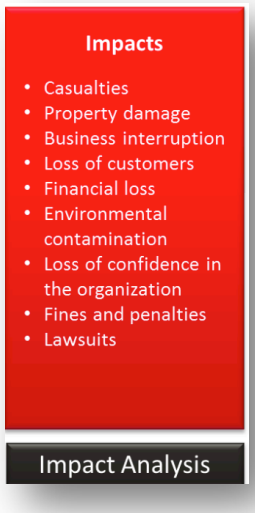
This represents how often a hazard that will impact the county is likely to occur. Frequency is based on both how often a hazard has occurred in the past and factors that have been determined to contribute to a hazard's potential future occurrence.

Distribution

This represents the geographic area that would be impacted should a hazard occur. It refers to how wide-spread a disaster's effects will be felt in the county.

Impact

The impact is the consequence or effect of the hazard on the community and its assets. A hazard occurrence impact could have considerable results on your relationships with customers, the surrounding community and other stakeholders. Contemplate scenarios and situations that would cause the County citizens or customers to lose confidence in your organization and its products or services. The impacts from hazards can be reduced by investing in mitigation actions, projects or initiatives.



In evaluating the "impact" for Columbia County, historical detail impacts and/or an estimate of potential losses are noted within the hazards identified. If a momentous and devastating storm decimated the entire county, then potential dollar costs would probably be based on the "just value figure" which was discussed in Section 3: $4,425,416,773 (2019 just value of the real property) + $383,830,751 (2018 tangible personal property) = **$4,809,247,524**.

The hazards profiled within this section can bring different consequences for the Columbia County's structures, infrastructure, economy and environment. The impact specifics are profiled within each hazard identified. Table 4.3 examines what types of structures and infrastructure would be impacted from the identified natural hazards.

Table 4.3 – Impacts on Columbia County's Structures and Infrastructure

Impacts on Structures and Infrastructure from Identified Hazards	All Structures	Mobile Homes	Poorly Constructed Homes	Non-Elevated Homes	Telecommunications	Electrical Utilities	Water / Sewer Utilities	Roadways	Waterways	Agriculture	Economic Disruption	Environmental Damage
Flooding	X	X	X	X	X	X	X	X	X	X	X	X
Sinkholes	X	X	X	X		X	X	X	X	X	X	X
Hurricanes/Tropical Storms	X	X	X	X	X	X	X	X	X	X	X	X
Tornadoes	X	X	X	X	X	X	X	X		X	X	X
Thunderstorms/ Strong Winds		X	X		X	X				X		
Lightning		X	X		X	X				X		
Hailstorms		X	X		X	X				X		
Riverine Erosion			X						X	X		X
Wildfires	X	X	X	X	X	X		X		X	X	X
Drought							X		X	X	X	X
Heat Wave										X		X
Winter Storms		X	X			X		X	X	X	X	X
Freezing Temperatures			X		X	X		X	X	X	X	

Natural Hazard Profiling

A critical component in the local mitigation plan is to analyze the natural hazards that face the community. Understanding the risk and consequences on the various hazards is the first part of mitigating the adverse effects of future events.

As stated earlier, profiling each natural hazard will include the following sections:

- ✓ **Hazard Overview** – synopsis of the hazard
- ✓ **Geographic Area** – area in the county with exposure to the hazard
- ✓ **Historical Occurrences** – previous occurrences in terms of frequency

- ✓ **Probability** - the chance of occurrence
- ✓ **Risk and Vulnerability Assessment –** process to identify potential hazards and analyze what could happen
- ✓ **Impact –** the consequences of effects of a hazard on the community and its assets
- ✓ **Extent** – the strength or magnitude

Flooding

A flood is an overflow of water onto normally dry land. The inundation of a normally dry area caused by rising water in an existing waterway, such as a river, stream, or drainage ditch, or the ponding of water at or near the point where the rain fell. Flooding is a longer-term event than flash flooding as it may last for days or even weeks. Several factors determine the severity of floods, including rainfall intensity, rainfall duration, topography, ground cover, and frequency of inundation. Floods are the most common hazard in the United States and the affects can be local, impacting a neighborhood or community, or entire river basins and multiple states.

Photo Source:https://www.claimsjournal.com/news/national/2017/12/05/281874.htm

Due to its inland location, Columbia County is not subject to coastal flooding, but is prone to riverine flooding. There is also a significant amount of low-lying area in the center of the county that would be subject to isolated lowland flooding.

Riverine and inland flooding is not only a threat due to tropical storms and hurricanes but can also occur from the severe and numerous thunderstorms from the spring to the fall months each year. In the spring, thunderstorms occur when warm troughs push back the cold weather to the north and gathering fuel from the moisture of the gulf. In the summer, short, but severe rains are generated from the heat of the summer day evaporating moisture into the air. In the fall, the cooler weather from the north pushes back the warmer weather and again, gathers fuel from the gulf, creating isolated thunderstorms.

In an undeveloped area, the water runoff system is provided by nature. In ever increasing urban areas flooding has necessitated the need for new and upgrades of existing drainage systems. Stormwater management systems have two purposes: the control of stormwater runoff to prevent or minimize damage to property and physical injury and loss of life which may occur during or after a very infrequent or unusual storm; and the control of stormwater to eliminate or minimize inconvenience or disruption of activity as a result of runoff from more frequently occurring, less significant

storms.

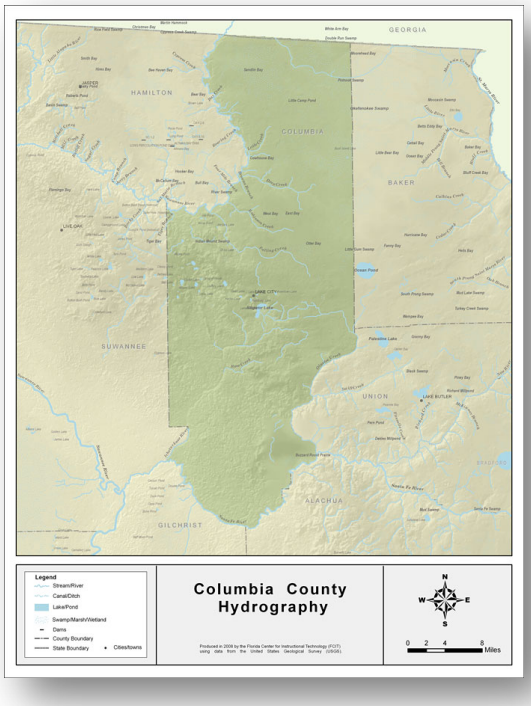
The following are several terms that are relevant to flooding and important for citizens to know:

- ✓ Flood Watch: Flooding is possible. Tune in to NOAA Weather Radio, commercial radio, or television for information.
- ✓ Flash Flood Watch: Flash flooding is possible. Be prepared to move to higher ground; listen to NOAA Weather Radio, commercial radio, or television for information.
- ✓ Flood Warning: Flooding is occurring or will occur soon; if advised to evacuate, do so immediately.

Figure 4.3 is the hydrography map, a type of topographic map, of Columbia County to reveal the slopes and contours of land. Hydrographic maps are specially made to survey underwater land terrain.

Figure 4.3 – Hydrography Map of Columbia County, Drainage Patterns

The drainage area of the Suwannee River at the mouth is 9,950 square miles, of which 4,230 square miles are in north-central Florida, and 5,720 square miles are in south-central Georgia. The drainage area of the Santa Fe River, at the mouth, is 1,380 square miles.



Source: http://fcit.usf.edu/florida/maps/pages/11200/f11225/f11225.htm

The 2018 and 2009 Flood Insurance Rate Maps (FIRM) were reviewed from the FEMA Flood Map Service Center. A hard copy of the County FIRM's are also available from the Columbia County Building and Zoning Department. The flood zones identified in the County based on the results of the engineering analyses are the following (Zones A; AE; AH and X):

Zone A is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

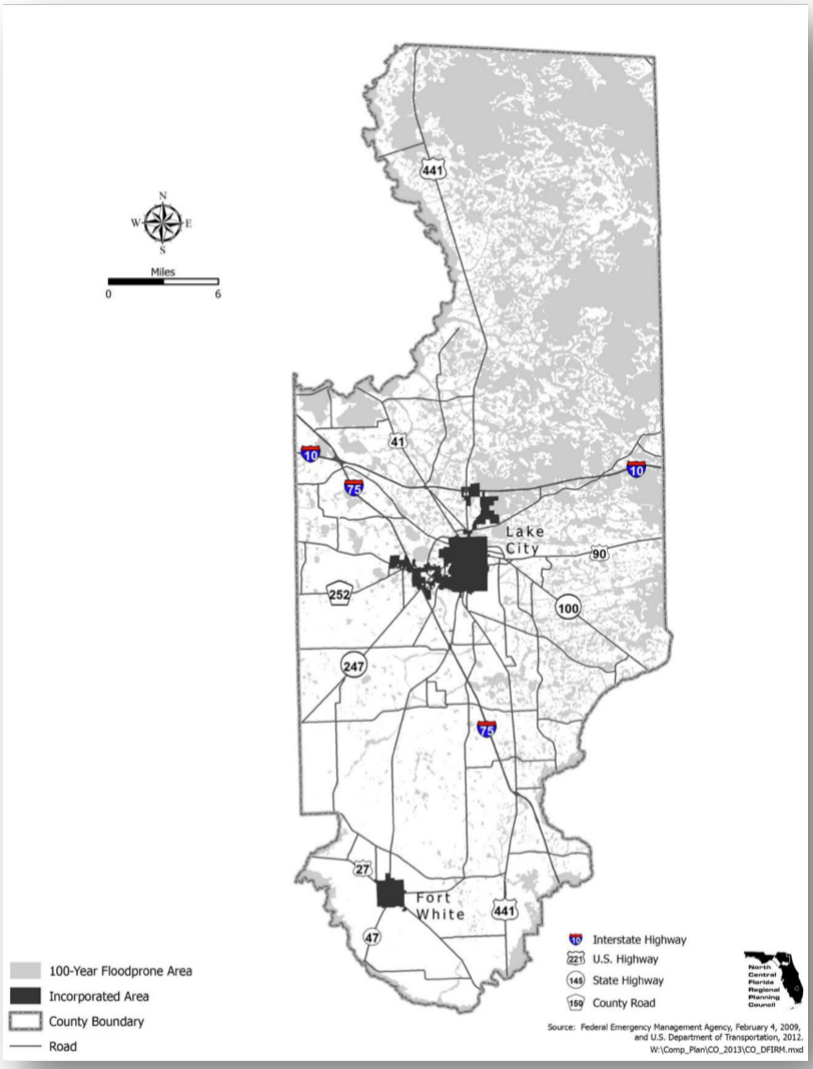
Zone AE is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2- percent annual chance floodplain, areas within the 0.2-percent annual chance floodplain, and to areas of 1-percent annual chance flooding where average depths are less than 1 foot, areas of 1-percent annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent annual chance flood by levees. No base flood elevations or depths are shown within this zone.

Figure 4.4 outlines the general flood 100-year floodprone area for the County.

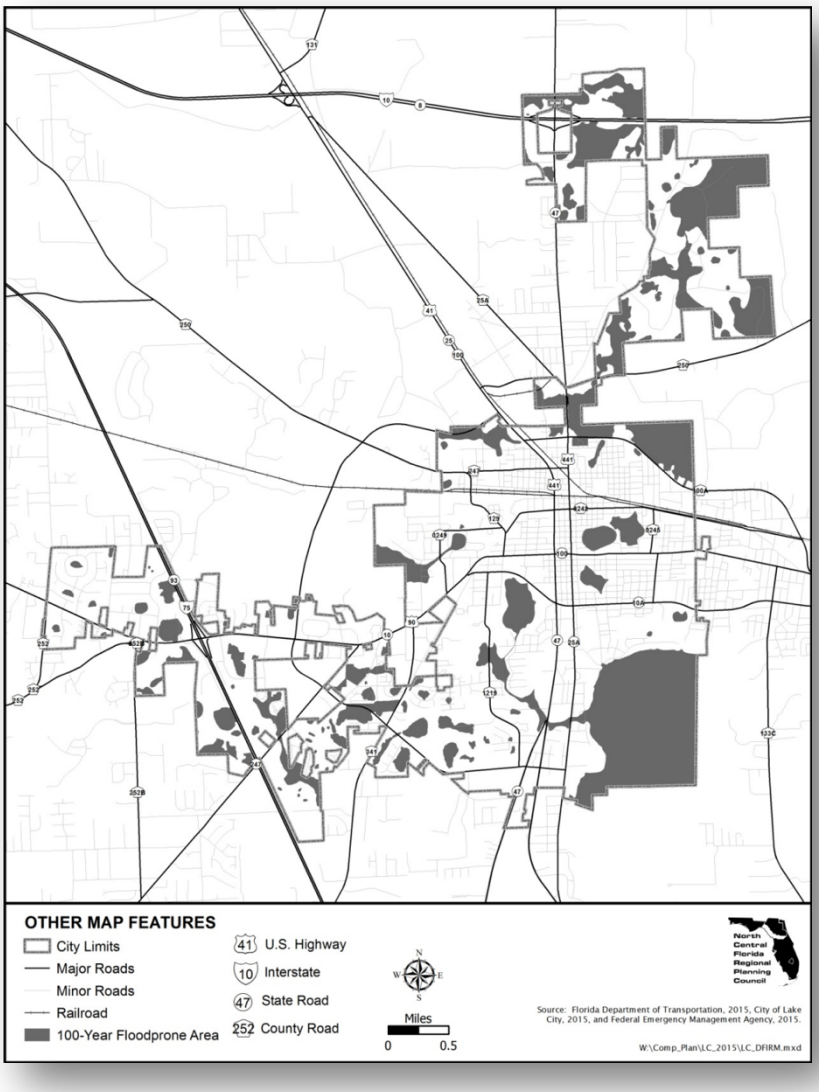
Figure 4.4 – General Flood Map for Columbia County



Source: Columbia County Comprehensive Plan, Amended February 15, 2018, Ordinance No. 17-21

Figure 4.5 outlines the 100-year floodprone areas for Lake City.

Figure 4.5 – Flood Prone Areas in Lake City



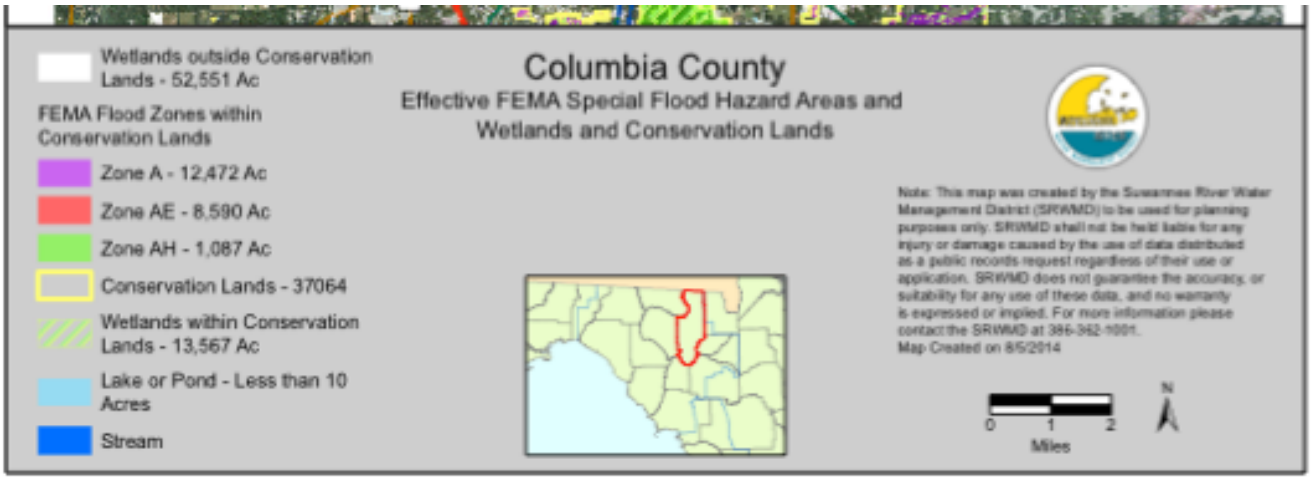
Source: Columbia County Comprehensive Plan, Amended February 15, 2018, Ordinance No. 17-21

Special Flood Hazard Area (SFHA)

The SFHA is the land area covered by the floodwaters of the base flood on the National Flood Insurance Program (NFIP) maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA's in Columbia County are land areas that are at high risk for flooding. The SFHA can be identified by several A and V zones, however, Columbia County has only the following zones: A, AE, and AH

The Suwannee River Water Management District (SRWMD) created the SFHA maps (northern and southern portions) for Columbia County on August 5, 2014, see Figures 4.7 and 4.8. The map classification (zoomed in version) outlines the classification details of the FEMA Flood Zone areas with Conservation Lands. See Figure 4.6.

Figure 4.6 – Map Classification for the Effective FEMA Special Flood Hazard Areas, Wetlands and Conservation Lands

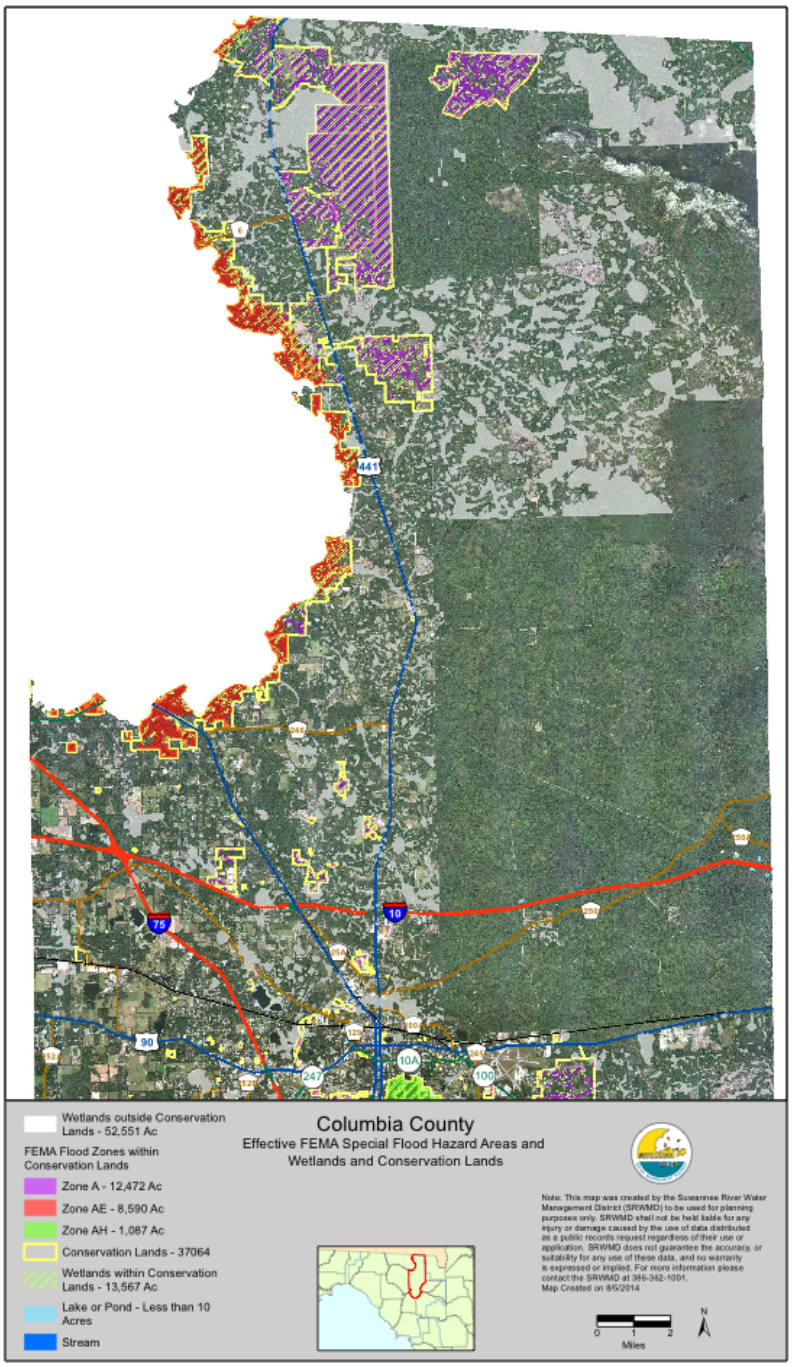


Source: SRWMD

SHFA Zones in Columbia County

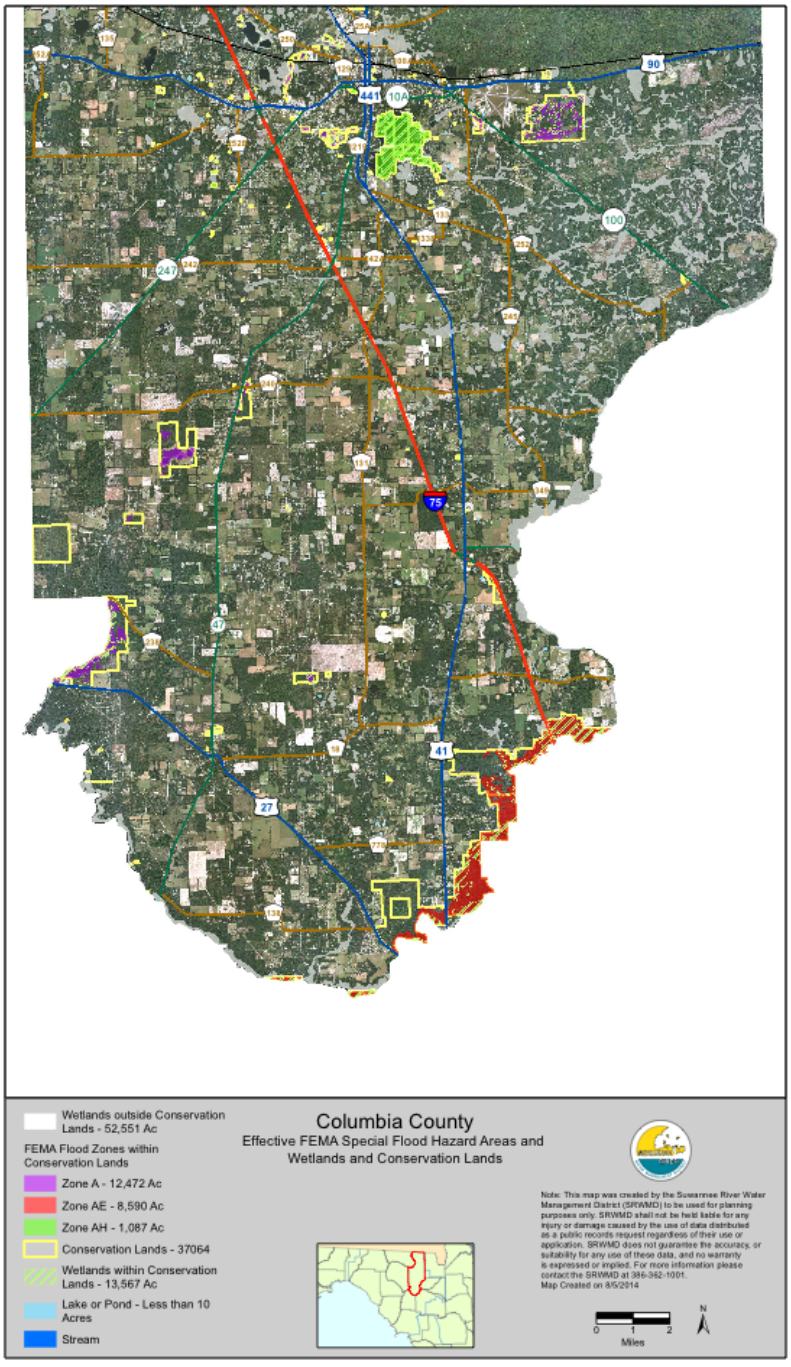
The Zones A and AE are located predominately in the Northwest and Southeast areas of Columbia County. Zone AH is centrally located in Columbia County. See the maps below.

Figure 4.7 – Columbia County - FEMA Special Flood Hazard Areas, and Wetlands and Conservation Lands (Northern portion of the County)



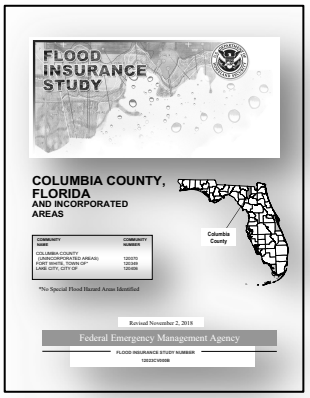
Source: SRWMD

Figure 4.8 – Columbia County - FEMA Special Flood Hazard Areas, Wetlands and Conservation Lands (Southern portion of the County)



Source: SRWMD

Details are from the FEMA Flood Insurance Study for Columbia County,
Principal Flood Problems, revised November 2, 2018



A number of major floods occurred on the Suwannee River during the 20th century. The four largest floods at White Springs occurred in October 1947, April 1948, April 1973, and April 1984. The respective discharges associated with these floods are 23,700 cubic feet per second (cfs), 28,5000 cfs, 38,100 cfs, and 26,100 cfs. The estimated return period for floods of these magnitudes are 30, 50,150, and 40 years, respectively.

The April 1973 flood was the largest flood at the Town of White Springs since 1862 and exceeded the 1948 flood by 3 feet at the White Springs gage. Floodwaters remained over the lowland for 30 days, and for a time several major highways (Interstate 75, U.S. Route 41, and U.S. Route 129) were closed. Many people were forced to evacuate their homes, and Columbia County was included in the "major disaster area" declared by the President.

During peak stages of the 1948 flood, the Suwannee River was out of its banks from the Gulf of Mexico to north of the Georgia-Florida state line and its width varied from 0.5 to 6 miles. The flooded area comprised almost 500 square miles along the major rivers.

The largest flood known to have occurred on the Santa Fe River in Columbia County was the flood of September 1964. The peak discharge for this flood was 17,000 cfs at the USGS gage near the Town of Ft. White and 20,000 cfs at the now non-existent USGS gage at the City of High Springs.

Note: The Town of White Springs is located in Hamilton County, however, details are noted from the as the USGS gage for the Suwannee River and the City of Lake City is approximately 13 miles from White Springs.

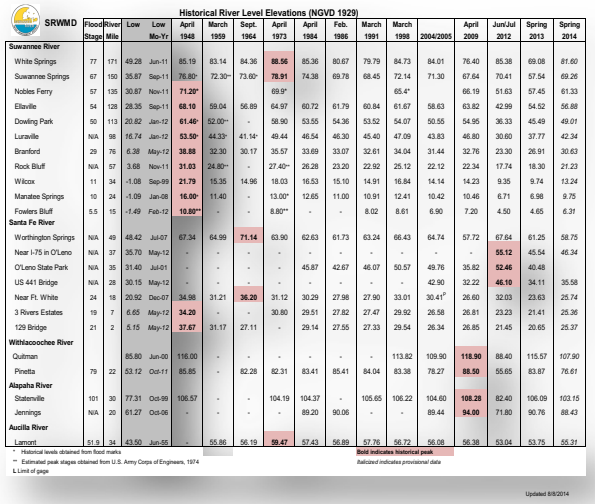
The National Weather Service recorded numerous increased stages along Suwanee River in Columbia County. Actions stages were recorded in September 2004, April 2009, February 2010, July 2013, and March 2014. Flood stages were only recorded once in the 2000s during March 2003. Moderate flood stages were experienced during April 2005 and April 2014.

Major flood stages were registered during October 2004, July 2012, and April 2014. In June 2012, Tropical Storm Debby produced torrential rains across central and north Florida. According to a report published by the National Hurricane Center in January 2013, rainfall totals in excess of 20 inches were observed between Lake City and the Florida-Georgia state border. Several bridges were damaged or completely washed out due to the heavy rains, and over 100 roads in Columbia County, including portions of Interstate 10, U.S. Route 319 and U.S. Route 98 remained closed due to flooding. The USGS gage on the Suwannee River at White Springs recorded a peak discharge of 28,800 cfs, similar to that observed at the gage in April 1948. On the Santa Fe River, a peak discharge of 11,800 cfs was observed at the USGS gage near the Town of Fort White. The Columbia County Sheriff's office estimated that at least 10,000 residents were directly affected by tropical storm Debby and that the cost of damages for infrastructure resulting from the storm likely exceeded $10 million.

Historical River Level Elevations

Figure 4.9 shows the historical levels obtained from flood marks and estimated peak stages based on U.S. Army Corps of Engineers 1974 data and Suwannee River Water Management District 2014 data.

Figure 4.9 – Historical River Level Elevations (NGVD 1929), updated 8/8/2014



Historical River Level Elevations (NGVD 1929)

SRWMD	Flood Stage	River Mile	Low	Low Mo-Yr	April 1948	March 1959	Sept. 1964	April 1973	April 1984	Feb. 1986	March 1991	March 1998	2004/2005	April 2009	Jun/Jul 2012	Spring 2013	Spring 2014
Suwannee River																	
White Springs	77	171	49.28	Jun-11	85.19	83.14	84.36	**88.56**	85.36	80.67	79.79	84.73	84.01	76.40	85.38	69.08	81.60
Suwannee Springs	67	150	35.87	Sep-11	76.80[L]	72.30[**]	73.60[L]	**78.91**	74.38	69.78	68.45	72.14	71.30	67.64	70.41	57.54	69.26
Nobles Ferry	57	135	30.87	Nov-11	**71.20***			69.9*				65.4*		66.19	51.63	57.45	61.33
Ellaville	54	128	28.35	Sep-11	**68.10**	59.04	56.89	64.97	60.72	61.79	60.84	61.67	58.63	63.82	42.99	54.52	56.88
Dowling Park	50	113	20.82	Jan-12	**61.46***	52.00[**]	-	58.90	53.55	54.36	53.52	54.07	50.55	54.95	36.33	45.49	49.01
Luraville	N/A	98	16.74	Jan-12	**53.50***	44.33[*]	41.14[*]	49.44	46.54	46.30	45.40	47.09	43.83	46.80	30.60	37.77	42.34
Branford	29	76	6.38	May-12	**38.88**	32.30	30.17	35.57	33.69	33.07	32.61	34.04	31.44	32.76	23.30	26.91	30.63
Rock Bluff	N/A	57	3.68	Nov-11	**31.03**	24.80[**]	-	27.40[**]	26.28	23.20	22.92	25.12	22.12	22.34	17.74	18.30	21.23
Wilcox	11	34	-1.08	Sep-99	**21.79**	15.35	14.96	18.03	16.53	15.10	14.91	16.84	14.14	14.23	9.35	9.74	13.24
Manatee Springs	10	24	-1.09	Jan-08	**16.00***	11.40	-	13.00*	12.65	11.00	10.91	12.41	10.42	10.46	6.71	6.98	9.75
Fowlers Bluff	5.5	15	-1.49	Feb-12	**10.80****	-	-	8.80**	-	-	8.02	8.61	6.90	7.20	4.50	4.65	6.31
Santa Fe River																	
Worthington Springs	N/A	49	48.42	Jul-07	67.34	64.99	**71.14**	63.90	62.63	61.73	63.24	66.43	64.74	57.72	67.64	61.25	58.75
Near I-75 in O'Leno	N/A	37	35.70	May-12	-	-	-	-	-	-	-	-	-	-	**55.12**	45.54	46.34
O'Leno State Park	N/A	35	31.40	Jul-01	-	-	-	-	45.87	42.67	46.07	50.57	49.76	35.82	**52.46**	40.48	
US 441 Bridge	N/A	28	30.15	May-12	-	-	-	-	-	-	-	-	42.90	32.22	**46.10**	34.11	35.58
Near Ft. White	24	18	20.92	Dec-07	34.98	31.21	**36.29**	31.12	30.29	27.98	27.90	33.01	30.41[P]	26.60	32.03	23.63	25.74
3 Rivers Estates	19	7	6.65	May-12	**34.20**	-	-	30.80	29.51	27.82	27.47	29.92	26.58	26.81	23.23	21.41	25.36
129 Bridge	21	2	5.15	May-12	**37.67**	31.17	27.11	-	29.14	27.55	27.33	29.54	26.34	26.85	21.45	20.65	25.37
Withlacoochee River																	
Quitman			85.80	Jun-00	116.00	-	-	-	-	-	-	113.82	109.90	**118.90**	88.40	115.57	107.90
Pinetta	79	22	53.12	Oct-11	85.85	-	82.28	82.31	83.41	85.41	84.04	83.38	78.27	**88.50**	55.65	83.87	76.61
Alapaha River																	
Statenville	101	30	77.31	Oct-99	106.57	-	-	104.19	104.37	-	105.65	106.22	104.60	**108.28**	82.40	106.09	103.15
Jennings	N/A	20	61.27	Oct-06	-	-	-	-	89.20	90.06	-	-	89.44	**94.00**	71.80	90.76	88.43
Aucilla River																	
Lamont	51.9	34	43.50	Jun-55	-	55.86	56.19	**59.47**	57.43	56.89	57.76	56.72	56.08	56.38	53.04	53.75	55.31

* Historical levels obtained from flood marks
** Estimated peak stages obtained from U.S. Army Corps of Engineers, 1974
L Limit of gage

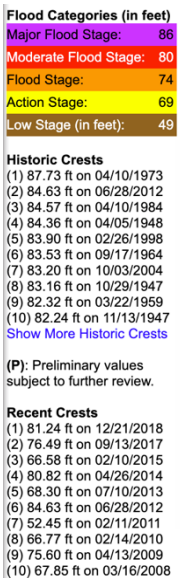
Bold indicates historical peak
Italicized indicates provisional data

Updated 8/8/2014

Source - http://www.srwmd.state.fl.us/DocumentCenter/View/136/NGVD29-Historical-Elevations?bidId=

Historical River Data from the National Weather Service
on the Suwannee River at White Springs and the Santa Fe River at Three Rivers Estates

Figure 4.10 - Suwannee River at White Springs
Flood Categories (in feet)



Flood Categories (in feet)

Major Flood Stage:	86
Moderate Flood Stage:	80
Flood Stage:	74
Action Stage:	69
Low Stage (in feet):	49

Historic Crests
(1) 87.73 ft on 04/10/1973
(2) 84.63 ft on 06/28/2012
(3) 84.57 ft on 04/10/1984
(4) 84.36 ft on 04/05/1948
(5) 83.90 ft on 02/26/1998
(6) 83.53 ft on 09/17/1964
(7) 83.20 ft on 10/03/2004
(8) 83.16 ft on 10/29/1947
(9) 82.32 ft on 03/22/1959
(10) 82.24 ft on 11/13/1947
Show More Historic Crests

(P): Preliminary values subject to further review.

Recent Crests
(1) 81.24 ft on 12/21/2018
(2) 76.49 ft on 09/13/2017
(3) 66.58 ft on 02/10/2015
(4) 80.82 ft on 04/26/2014
(5) 68.30 ft on 07/10/2013
(6) 84.63 ft on 06/28/2012
(7) 52.45 ft on 02/11/2011
(8) 66.77 ft on 02/14/2010
(9) 75.60 ft on 04/13/2009
(10) 67.85 ft on 03/16/2008

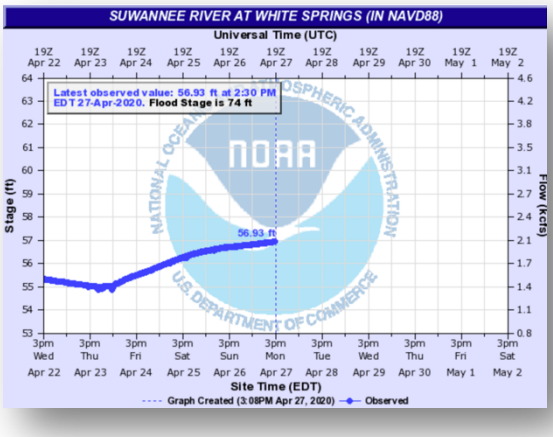


Table 4.4 - Flood Impacts from the Suwannee River

Feet	Flood Impacts from the Suwannee River
97.9	Water reaches the top of the Interstate 75 bridge railing.
96.5	Water reaches the top of the US 41 bridge railing.
96.3	Water reaches the top of the SR 136 bridge railing.
94.9	Water begins to flood the main Interstate 75 bridge travel lanes.
94.5	Water begins to flood the SR 136 bridge travel lanes.
93.5	Water begins to flood the US 41 bridge travel lanes.
92.6	Water begins to flood the Interstate 75 bridge travel lanes just south of the Suwannee River in Suwannee County.
90.7	Water reaches the approach road surface to the US 41 bridge.
89.7	Water reaches the approach road surface to the Interstate 75 bridge over the Suwannee River.
89.2	Water reaches the base of the Interstate 75 bridges over the Suwannee River. Water also reaches the base of the SR 136 bridge near White Springs.
88.5	Water reaches the base of the US 41 bridge.
88	The railroad tracks flood near the US 41 crossing.
87	Water reaches the base of the old US 129 foot bridge across the river. Homes in this area are subject to flooding.
86.8	Water reaches the approach road surface to the SR 136 bridge just north of the agriculture inspection station.
85.5	Water begins to flood SR 136 well south of the bridge in Columbia County.
85	Water reaches the base of the railroad bridge at US 41.
82	Water begins to surround homes along NW Stephen Foster Drive in Columbia County. Homes in the area not elevated flood at this level. In Hamilton County, the Gazebo at the Stephen F Foster State Park floods at this level.
81	Water reaches the observation deck at the White Springs Swim House. Water floods areas south of SE 100th Way in Hamilton County. Homes not elevated in this area are subject to flooding.
80	Water moves toward NW Stephen Foster Drive and begins to flood travel lanes in the 500 block in Columbia County.

79	Water reaches the top of the bank at the Stephen F Foster State Park. Low areas within the park begin to flood at this level.
77	Homes on NW Null Road in Columbia County become isolated at this level. Homes not elevated begin to flood at this level.
75	Access to White Springs Swim House is impassible.
74	The parking lot to the Blue Sink launch floods in Suwannee County. The area is not accessible above this level. Flooding expands into the park at US 41 in Hamilton County.
72	Water reaches the top of the bank at the park at US 41 in Hamilton County. All public boat ramps between White Springs and Suwannee Springs are subject to closure.
70	Water reaches the top of the boat ramp at US 41 in Hamilton County.

Source - NWS: https://water.weather.gov/ahps2/hydrograph.php?wfo=jax&gage=wpf1

Figure 4.11 - Santa Fe River at Three River Estates (Ft. White)
Flood Categories in Feet

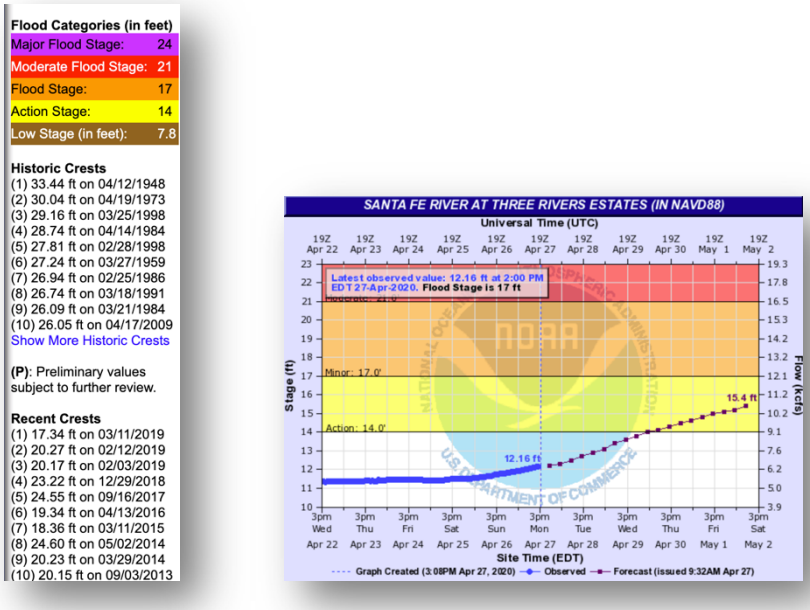


Table 4.5 - Flood Impacts from the Santa Fe River

Feet	Flood Impacts from the Santa Fe River	
31	Considerable flood damage to structures occurs within 1 mile of the Santa Fe and Ichetucknee Rivers.	
29	Significant flooding continues. Access to areas within one half mile of Santa Fe or Ichetucknee Rivers becomes impossible. Numerous homes, included those elevated, continue to flood.	
28	Homes even with stilts near the river are prone to flooding throughout the area. Flood waters will approach River Run Road near 280th Street in Suwannee county. SW Nebraska Terrace in Columbia County floods.	
26	Significant flooding continues throughout the area. Flooded area along the Ichetucknee River expands both in Suwannee and Columbia Counties. Numerous homes are flooded at this level.	
24	Flooding expands across the area affecting numerous homes on Santa Fe Road and SW Riverside Avenue in Columbia County. Access to 29th loop in Suwannee County becomes restricted.	
23	Homes are inaccessible along River Run Road in Suwannee County west of 33rd Road.	
22	River Run Road at 29th loop floods in Suwannee County. Santa Fe Road in Columbia County is inaccessible.	
21	Homes are surrounded on River Run Road in Suwannee County. Structures flood along Santa Fe Road west of Idaho Parkway in Columbia County.	
20	Access to homes on Santa Fe Road below SW Riverside Avenue becomes restricted in Columbia. Flooding begins on Santa Fe and Wilson Springs Road.	
19.8	Waters begins to affect homes in the Hollingsworth Bluff area at State Route 47.	
19	Water begins to enter backyards of residences along the Ichetucknee River.	
18.75	Florida Fish and Wildlife Commission expands the no wake zone restriction further upstream on the Santa Fe River from the unnamed island 1.5 miles downstream on the Wilson's Spring Boat Ramp to one-half mile upstream of the State Road 47 bridge.	
18	Water begins to flood River Run Road in Suwannee County.	
17	Water begins to enter backyards of residences on Santa Fe Road in Columbia County and on River Run Road in Suwannee County.	
16.25	Florida Fish and Wildlife Commission begins enforcement of a no wake zone on the Santa Fe River from t he unnamed island 1.5 miles downstream of the Wilson's Spring Boat Ramp to the confluence with the Suwannee River and on the Ichetucknee River upstream to the US 27 bridge.	
16	Lowland flooding begins on SW Santa Fe Drive south of Santa Fe Road in Columbia County.	

Source – NWS: https://water.weather.gov/ahps2/hydrograph.php?wfo=jax&gage=tref1

Historical Flood Occurrences

According to the NCDC, (1/1/1950 – 12/31/2019), there were 9 flood, 9 flash flood, and 30 heavy rain occurrences reported in Columbia County over the last 69 years with location, date, time, the type of event, if there were any deaths or injuries, and the property and crop damage estimates.

Table 4.6 – Flood Occurrences in Columbia County – (1/1/1950 – 12/31/2019)

Location or County	Date	Time	Type	Death	Injuries	Property Damage	Crop Damage
Lake City	10/2/1996	3:00	Flash Flood	0	0	0.90K	0.00K
Countywide	2/17/1998	2:35	Flash Flood	0	0	0.00K	0.00K
Lake City	2/17/1998	3:30	Flash Flood	0	0	20K	0.00K
Columbia (Zone)	3/1/1998	00:01	Flood	0	0	2.35M	0.00K
Countywide	3/30/2000	15:30	Flash Flood	0	0	3K	0.00K
Countywide	3/9/2003	10:00	Flash Flood	0	0	0.00K	0.00K
Lake City	7/7/2004	19:09	Heavy Rain	0	0	0.00K	0.00K
Columbia (Zone)	9/8/2004	00:00	Flood	0	0	0.00K	0.00K
Columbia (Zone)	9/9/2004	11:00	Flood	0	0	0.00K	0.00K
Lake City	9/9/2004	20:00	Heavy Rain	0	0	0.00K	0.00K
Columbia (Zone)	9/28/2004	12:00	Flood	0	0	0.00K	0.00K
Lake City	8/21/2006	08:30	Heavy Rain	0	0	0.00K	0.00K
Bass	7/28/2007	16:30	Heavy Rain	0	0	0.00K	0.00K
Evans Pines	4/6/2008	19:00	Heavy Rain	0	0	0.00k	0.00K
Ft. White	9/18/2009	06:15	Heavy Rain	0	0	0.00K	0.00K
Ft. White	1/21/2010	16:00	Flood	0	0	0.00K	0.00K
Ft. White	1/21/2010	16:00	Flood	0	0	0.00K	0.00K
Lake City	8/6/2011	15:00	Heavy Rain	0	0	0.00K	0.00K
Watertown	6/7/2012	16:45	Heavy Rain	0	0	0.00K	0.00K
Ft. White	6/14/2012	14:45	Heavy Rain	0	0	0.00K	0.00K
Winfield	6/25/2012	06:26	Flood	0	0	100K	0.00K
Winfield	6/26/2012	15:45	Flash Flood	0	0	10K	0.00K
Lake City	3/23/2013	12:40	Heavy Rain	0	0	0.00K	0.00K
Lake City	7/31/2013	16:00	Heavy Rain	0	0	0.00K	0.00K
Lake City	3/16/2014	22:49	Heavy Rain	0	0	0.00K	0.00K
Lake City	9/5/2014	07:00	Heavy Rain	0	0	0.00K	0.00K
Columbia	9/5/2014	23:00	Heavy Rain	0	0	0.00K	0.00K
Country Club Estates	9/6/2014	06:00	Flash Flood	0	0	100K	0.00K
Winfield	9/7/2014	04:00	Flash Flood	0	0	200K	0.00K
Columbia	5/31/2015	17:45	Heavy Rain	0	0	0.00K	0.00K
Suwannee Valley	7/24/2015	16:00	Heavy Rain	0	0	0.00K	0.00K
Lake City	8/4/2015	20:56	Flood	0	0	0.00K	0.00K
Lake City	8/4/2015	16:00	Heavy Rain	0	0	0.00K	0.00K
Winfield	6/18/2016	15:00	Heavy Rain	0	0	0.00K	0.00K
Winfield	8/7/2016	17:00	Heavy Rain	0	0	0.00K	0.00K

Lake City	4/3/2017	06:00	Heavy Rain	0	0	0.00K	0.00K
Lake City	4/4/2017	08:05	Heavy Rain	0	0	0.00K	0.00K
Winfield	7/22/2017	13:05	Heavy Rain	0	0	0.00K	0.00K
Winfield	7/30/2017	08:45	Heavy Rain	0	0	0.00K	0.00K
Lake City	9/11/2017	06:30	Flash Flood	0	0	0.00K	0.00K
Winfield	6/11/2018	12:44	Heavy Rain	0	0	0.00K	0.00K
Lake City	12/14/2018	11:30	Flood	0	0	0.00K	0.00K
Winfield	7/4/2019	17:50	Heavy Rain	0	0	0.00K	0.00K
Columbia	7/4/2019	21:15	Heavy Rain	0	0	0.00K	0.00K
Bass	7/4/2019	21:15	Heavy Rain	0	0	0.00K	0.00K
Winfield	7/24/2019	14:00	Heavy Rain	0	0	0.00K	0.00K
Winfield	7/28/2019	06:00	Heavy Rain	0	0	0.00K	0.00K
Benton	11/14/2019	23:00	Heavy Rain	0	0	0.00K	0.00K
Totals:	**Property Damage: $2,783,900**						

Source: http://www.ncdc.noaa.gov/stormevents/listevents

Hazard Event Narrative – Extent and Impact

1. 3/1/1998 – 3/31/1998, Columbia Zone – Several counties in Florida (St. Johns, Baker, Nassau, Union Suwannee, Alachua, Marion, Hamilton, Gilchrist, Flagler, Duval, Clay, Bradford and Putnam) are included in this total property damage figure of $2.35 million. The total flooding data related to El Nino observed more than 2,800 homes and more than 175 businesses were destroyed.

2. 6/25/12, Winfield - Tropical Storm Debby moved across the area from the northeast Gulf of Mexico. Deep tropical moisture combined with a stalled frontal boundary across north Florida over a period of several days caused extensive, flooding rainfall, as well as historic river flooding on the St. Mary's River. A few severe storms developed each day, but the main impact was flooding rainfall and extensive river flooding which flooded homes in Baker, Charlton, Camden and Nassau counties. At 7:26 am the park service reported a 24-hour rainfall total of 4.1 inches about 2 miles east of Lake City. At 9 am on 6/25, law enforcement reported eastbound Interstate 10 at mile marker 301 was closed due to high floodwaters. At 9:15 am that morning, law enforcement reported U.S. Highway 41 southbound was closed near Interstate 10 due to floodwaters. At 9 pm, law enforcement reported Interstate 10 eastbound at mile marker 301 was closed due to standing floodwaters. At 8:16 am on 6/26, a cooperative observer reported a 24 -hour rainfall total of 8.77 inches in Lake City. On 6/28 at 3:57 pm, the public reported a monthly rainfall total of 27.55 inches with 19.99 inches between the 23rd and 26th about 5 miles northeast of Ichetucknee Springs. The cost of damage was underestimated.

3. 9/6/14, Country Club Estates - A weak low level trough extended across the Okefenokee Swamp southward across the Suwanee River Valley, which triggered early morning slow moving showers and thunderstorms across Columbia county. A moisture feed off of the Gulf of Mexico due to low level SSW winds and spokes of energy rotating around a low center meandering over the local area fueled slow moving convection, which caused flash flooding over Columbia county generally between the cities of Columbia and Lake City. Daily storm total amounts ranged from 7 to almost 10.5 inches. A survey revealed flash flooding caused a home off of SW Edward Terrace was flooded out (about 2 inches of water in the home) with sewage in the backyard. This occurred around 7 am. Around 6 am, a retention pone was flooded out and surrounded several homes off of SW Nightshade Drive about 3 miles NE of the city of Columbia. Around the same time, another retention pond off of Fall Court surpassed bank full and flooded a garage. Several inches of floodwater covered roadways throughout Columbia County.

4. 9/7/2014, Winfield- A broad low-pressure system slowly meandered over the forecast area Sept. 6th through the 8th. On the night of the 6th and 7th a widespread area of nocturnal rain broke out across inland NE Florida, which dumped rainfall amounts of 8- 14inches over portions of Columbia County, especially from Lake City southward toward Columbia. Several homes were flooded with numerous road closures. Flash flood warnings were issued for almost the same area each morning for this area of Columbia County. Widespread flooding caused numerous road closures and flooded approximately 56 homes. One flooded home was located at SW Fedora Way, and residents used canoes and kayaks to travel streets. There was about 1 foot of standing water inside the home. Portions of Interstate 10 near mile marker 296 were closed due to flooded roads. Columbia City Public Works installed pumps at the intersection of Nightshade and Broadleaf Drives due to flooded roads and water nearing homes. Portions of State Road 47 just south of Watson Road were covered in several inches of standing waters. Radar estimated about 8-13 inches between Lake City and just south of Lake City.

Risk and Vulnerability Assessment

Flooding events either from a tropical storm, a hurricane or simply a heavy summer rain, poses a major hazard throughout the county and it is not necessary for development to be in the 100-year floodplain to be at risk. With development along the Suwannee and Santa Fe Rivers and their floodplains, numerous structures and roads are at risk from more frequent flood events.

Vulnerability for Columbia County's Structures, Facilities and Infrastructure

Columbia County's buildings, infrastructure and critical facilities are considered vulnerable to damage caused by flooding events. Table 4.4 – Flood Impacts from the Suwannee River and Table 4.5 – Flood Impacts from the Santa Fe River describes the vulnerability at water crest levels. Considerable and significant damage could occur if either river crested at peak levels.

In addition, the lakecityjournal.com wrote an article in July 2012 in reference to roads and neighborhoods in Columbia County prone to flooding were the old Ichetucknee River once ran through them. See Appendix D.

Vulnerability for the Columbia County's Population

The most vulnerable populated area in the county are the citizens who are close proximity to the Suwannee and Santa Fe Rivers. In addition to those that live within the 100-year floodplain areas in Lake City and the unincorporated area of the County.

Table 4.7 – Population in 100 and 500 - Year Flood Return Period

Population in 100 and 500 - Year Flood Return Period *(2015 population estimates)*		
County	**100-Year Flood**	**500-Year Flood**
Columbia	3,308	3,171

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.8 – Economic Loss for Buildings by Return Period

Direct Economic Loss for Buildings for Columbia County by Return Period (in dollars)		
County	**100-Year Flood**	**500-Year Flood**
Columbia	$31,487,000	$40,940,000

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.9 – Inland Flood Hazard Sum of County Facilities

Inland Flood Hazard Sum of Columbia County Facilities						
Floodplain	**Hospitals**	**Fire Stations**	**Police Stations**	**Schools**	**Other**	**Totals**
100	0	1	2	6	99	**108**
500	0	1	2	8	116	**127**

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.10 – Inland Flood Hazard Value of County Facilities

Inland Flood Hazard Value of Columba County Facilities (in dollars)						
Floodplain	**Hospitals**	**Fire Stations**	**Police Stations**	**Schools**	**Other**	**Totals**
100	0	306,722	3,706,395	26,386,173	20,036,587	**50,435,877**
500	0	306,722	3,706,395	36,300,231	20,729,873	**61,043,221**

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.11 – Inland Flood Hazard Building Economic Count

Inland Flood Hazard Building Economic Count 100-year and 500-year Floodplain for Columbia County								
Floodplain	**Residential**	**Commercial**	**Medical**	**Industrial**	**Agriculture**	**Education**	**Government**	**Totals**
100	4,157	339	3	110	1,078	32	141	**6,196**
500	797	31	2	3	97	6	24	**989**

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.12 – Inland Flood Hazard Building Economic Values

Inland Flood Hazard Building Economic Values 100-year and 500-year Floodplain for Columbia County								
Flood -plain	**Residential**	**Commercial**	**Medical**	**Industrial**	**Agriculture**	**Education**	**Government**	**Totals**
100	447,486,784	125,443,277	33,274,796	82,081,547	548,671,772	33,971,723	151,103,311	**1,514,201,691**
500	90,485,397	34,305,175	23,715,940	937,898	55,572,899	14,661,463	22,450,748	**252,718,755**

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Summary details for flooding events:

Probability of Future Occurrences	There is a high probability (at least 1 occurrence every year) that Columbia County will continue to experience flooding associated with large tropical storms, powerful hurricanes, and heavy rainfall that generally occur between June and October.
Geographic Area	The entire planning area (the incorporated and unincorporated areas of Columbia County) is at high risk to flooding events. Columbia County is subject to flooding as a result of 100-year storm events. According to the FEMA flood zone designations, the majority of the A zone areas (1% annual chance of flooding) are in the more rural, unincorporated areas of the County. According to accounts of historical flood events, there has been significant localized flooding when a storm produces a large amount of heavy rain in a short time period. This localized flooding can be attributed to storm drains becoming clogged, damaged, or defective, and incapable of performing the proper draining function in the incorporated areas of the County.
Extent	Based on the quantitative measurement and referencing the flood depth for this hazard, the worse- case scenario would be another severe and long duration thunderstorm, hurricane or tropical storm event accompanied with heavy rain which could cause flooding for several days, weeks to a month or longer surpassing the April 1973 flood event. The April 1973 flood was the largest flood at the Town of White Springs since 1862 and exceeded the 1948 flood by 3 feet at the White Springs gage. (The Town of White Spring is located approximately 12.8 miles northwest of Lake City). Floodwaters remained over the lowland for 30 days, and for a time several major highways (Interstate 75, US Route 41, and US Route 129) were closed. Many people were forced to evacuate their homes, and Columbia County was included in the "major disaster area" declared by the President." According to SRWMD, Historical River Level Elevations: The flood stage level for the Suwannee River gage level measurement that affects Columbia County is: 77 April 1948, the Suwannee River gage level measurement was: 85.19 April 1973, the Suwannee River gage level measurement was: **88.56** April 1984, the Suwannee River gage level measurement was: 85.36 June/July 2012, the Suwannee River gage level measurement was: 84.63 Tropical Storm Debby – Details from NCDC, at 8:16 am on 6/26, a cooperative observer reported a 24 -hour rainfall total of 8.77 inches in Lake City. On 6/28 at 3:57 pm, the public reported a monthly rainfall total of 27.55 inches with 19.99 inches between the 23rd and 26th about 5 miles northeast of Ichetucknee Springs. The cost of damage was estimated, and is likely greatly under estimated.
Impact	Depending on crest levels of the rivers, Impact specifics in Tables 4.4 – 4.5 – Impact details for the Suwanee River and Santa Fe River, significant structural and infrastructure damage would occur.

	1998 The Columbia County community, the residents, structures, and critical facilities, suffered from the March 1998 flood event with over $2.35 million in property damage. One of the lowest areas in Columbia County is the Callaway subdivision, located off of State Road 247. Many homes were flooded during this event and some homes were demolished and other had extensive renovations. According to NCDC, more than 2800 homes and 175 businesses were destroyed from the 1998 flood event, however, this recorded figure on homes and businesses were from several counties and specifics for Columbia County was not recorded. 2012 During Tropical Storm Debby, there was more flooding in the Callaway subdivision. Several bridges were damaged or completely washed out due to the heavy rains, and over 100 roads in Columbia County, including portions of Interstate 10, U.S. Route 319 and U.S. Route 98 remained closed due to flooding. The Columbia County Sheriff's office estimated that at least 10,000 residents were directly affected by tropical storm Debby and that the cost of damages for infrastructure resulting from the storm likely exceeded $10 million.

Prevention Methods for Flooding Events

Columbia County does an excellent job informing the residents on floods from mapping to safety measures to specifics on what to do after a flood event. Visit: https://www.columbiacountyfla.com/FloodInformation.asp#top

Sinkhole

A sinkhole is a natural depression or hole in the Earth's surface caused by karst processes — the chemical dissolution of carbonate rocks or suffosion processes for example in sandstone. Sinkholes may vary in size from less than 1 to 600 meters (3.3 to 2,000 ft) both in diameter and depth and vary in form from soil-lined bowls to bedrock-edged chasms. They may be formed gradually or suddenly and are found worldwide.

Sinkholes are a common feature of Florida's landscape. They are only one of many kinds of karst landforms, which include caves, disappearing streams, springs, and underground drainage systems, all of which occur in Florida. Dissolution of carbonate rocks begins when they are exposed to acidic water. Most rainwater is slightly acidic and usually becomes more acidic as it moves through decaying plant debris.

Limestone in Florida is porous, allowing the acidic water to percolate through their strata, dissolving some limestone and carrying it away in solution. Over time, this persistent erosion process has created extensive underground voids and drainage systems in much of the carbonate rocks throughout the state. Collapse of overlying sediments into the underground cavities produces sinkholes.

Although a sinkhole can form without warning, specific signs can signal potential development:

- Slumping or falling fence posts, trees or foundations;
- Sudden formation of small ponds;
- Wilting vegetation;
- Discolored well water; and/or
- Structural cracks in walls, floors.

According to the SRWMD and the U.S. Geological Survey

There are many types of sinkholes, but the two occurring most often within the SRWMD are *collapse* and *solution* sinkholes.

A collapse sinkhole forms suddenly as the weight of the overlying soil suddenly becomes too great, and the earth collapses until it fills the limestone cavity. At land surface, a circular hole appears, which may or may not contain water. Factors that may contribute to the collapse include:

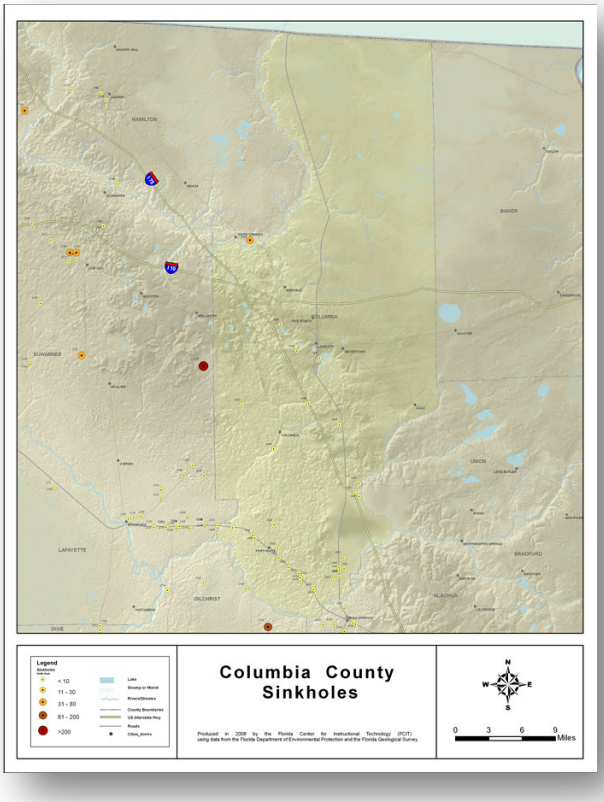
- Large changes in the water table caused by too much or little rain;
- Drilling a well into the cavity;
- Pumping groundwater from near the cavity;
- Constructing buildings above the cavity; and
- Diverting drainage to the areas where a cavity exists.

A solution sinkhole, on the other hand, develops slowly and continuously. It forms where sand or other relatively thin materials slowly and steadily sprinkle downward to fill the cracks and joints that occur in the underground limestone layers.

As a sinkhole gets bigger, it collects more surface water and runoff, which commonly carries sand, silt and clay particles. This material can sometimes plug the sinkhole, thereby creating a lake or pond. Lakes that once were collapse sinkholes can sometimes unplug and drain into the underground aquifer. If the lake becomes polluted, this can be a health hazard to the people whose drinking water wells tap into the connected aquifer.

Located in Columbia County, Alligator Lake, (photo on the left), is an example of a sinkhole lake.

Figure 4.12 – Sinkhole Map of Columbia County



Source: http://fcit.usf.edu/florida/maps/pages/11100/f11122/f11122.htm

Historical Sinkhole Occurrences

Sinkhole occurrence locations have been documented on public and private properties in Columbia County. Due to the inability to access to private property, it is likely that possible sinkhole occurrences have not been recorded and are not mapped by the county. The public property sinkholes have been recorded by the Florida Geological Survey and by the County Emergency Management Department and are noted in table 4.13.

Table 4.13 – Sinkhole Occurrences in Columbia County

Date Discovered	Latitude	Longitude
7/27/1970	29.8875	-82.66528
10/21/1970	29.8875	-82.67222
1/1/1970	29.90972	-82.69861
10/11/1971	29.8875	-82.61111
8/25/1971	29.86806	-82.64722
10/20/1971	29.88889	-82.66944
6/26/1973	30.11667	-82.65833
8/16/1973	29.93611	-82.69583
9/6/1972	29.93611	-82.73472

9/25/1972	29.89167	-82.73472
10/30/1972	29.85972	-82.64444
10/31/1972	29.89583	-82.60833
1/15/1974	29.88472	-82.60694
6/9/1974	30.11667	-82.6625
1/14/1975	29.95278	-82.70556
1/25/1975	29.89722	-82.68472
unknown	29.88333	-82.66667
unknown	29.89167	-82.60833
unknown	29.89167	-82.60833
2/6/1978	30.08333	-82.60556
6/27/1983	30.05222	-82.705
9/30/1982	29.93972	-82.73806
3/19/1985	30.17083	-82.66667
9/15/1988	29.99306	-82.58333
3/4/2005	30.17	-82.71
1/2/2007	30.021	-82.77703
5/17/2009	29.8884	-82.69616

Source: Columbia County Emergency Management

According to the Columbia County Department of Emergency Management, there have been no significant sinkhole occurrences in the county since May 2009.

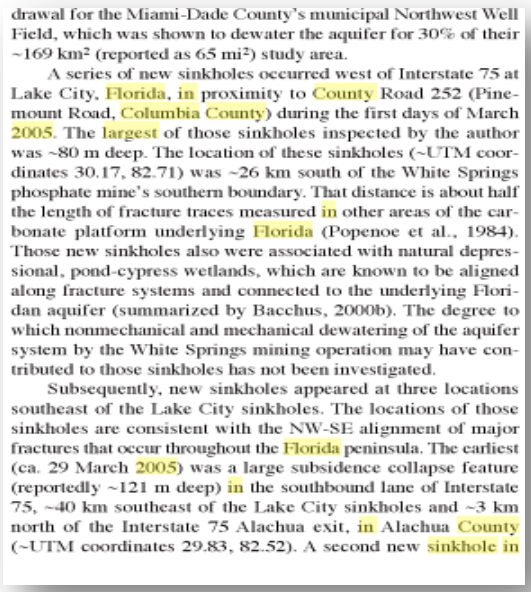
Sinkhole in Lake CIty – March 4, 2005

As reported by the Geological Society of America, the largest sinkhole in Columbia County was in March 2005. Details reveal that during the first days in March, the largest of the sinkholes was 80 m deep or 262.467 feet deep and the location was 30.17 and -82.71, approximately 16 miles south of the White Springs phospate mine's southern boundary.

Photo Source: The Gainesville Sun, Tracy Wilcox

Subsequently, new sinkholes appearaed at three locations southeast of the Lake City sinkholes. The first was on March 29, 2005 was a large subsidence collapse located in the southbond lane of I-75, approximately 25 miles southeast of Lake City and around 2 miles north of Alachua exit was another sinkhole 121 meters or approximately 397 feet deep in Alachua County.

Figure 4.13 – Geological Society of America



drawal for the Miami-Dade County's municipal Northwest Well Field, which was shown to dewater the aquifer for 30% of their ~169 km² (reported as 65 mi²) study area.

A series of new sinkholes occurred west of Interstate 75 at Lake City, Florida, in proximity to County Road 252 (Pinemount Road, Columbia County) during the first days of March 2005. The largest of those sinkholes inspected by the author was ~80 m deep. The location of these sinkholes (~UTM coordinates 30.17, 82.71) was ~26 km south of the White Springs phosphate mine's southern boundary. That distance is about half the length of fracture traces measured in other areas of the carbonate platform underlying Florida (Popenoe et al., 1984). Those new sinkholes also were associated with natural depressional, pond-cypress wetlands, which are known to be aligned along fracture systems and connected to the underlying Floridan aquifer (summarized by Bacchus, 2000b). The degree to which nonmechanical and mechanical dewatering of the aquifer system by the White Springs mining operation may have contributed to those sinkholes has not been investigated.

Subsequently, new sinkholes appeared at three locations southeast of the Lake City sinkholes. The locations of those sinkholes are consistent with the NW-SE alignment of major fractures that occur throughout the Florida peninsula. The earliest (ca. 29 March 2005) was a large subsidence collapse feature (reportedly ~121 m deep) in the southbound lane of Interstate 75, ~40 km southeast of the Lake City sinkholes and ~3 km north of the Interstate 75 Alachua exit, in Alachua County (~UTM coordinates 29.83, 82.52). A second new sinkhole in

Source: Perspectives on karst geomorphology, hydrology, and geochemistry – a tribute volume to Derek C Ford and William B White - Edited by Russell S Harmon and Carol M Wicks, page displayed by permission of the Geological Society of America, page 228

Sinkhole Study – The Favorability of Florida's Geology to Sinkhole Formation

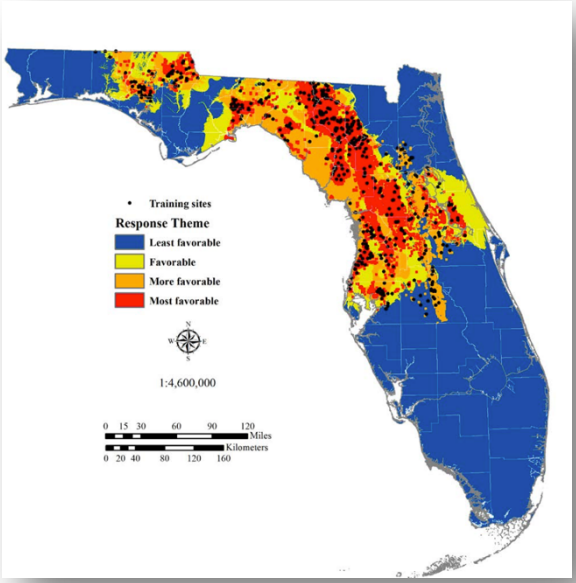
In August 2013, the Florida Geological Survey, in conjunction with the Florida Division of Emergency Management, a federal grant to conduct a statewide assessment of sinkhole vulnerability over a three-year period with geologists conducting a one-year pilot study in Hamilton, Suwannee and Columbia counties.

In June 2017 the study was completed. FDEM included the results in the 2018 State Hazard Mitigation Plan, Appendix H: Sinkhole Report. Conclusions noted in the study state… "A WofE model was successfully used to map the favorability of Florida's geology to sinkhole formation for use as a tool for developing hazard mitigation strategies. The results of this model do not suggest that any given area may or may not have a sinkhole. Instead, this model identifies areas of the state that have the favorable geology for sinkhole formation in large numbers during significant triggering events such as a large rainfall preceded by a prolonged drought, or an event where the water level in the aquifer is abruptly changed due to pumping activities."

The assessment will assist planners, builders and environmental regulators for the improvement of health and safety for the populated areas as well as economic benefits.

Figure 4.14 – Highly Favorable Sinkhole Formation Map

As concluded by The Favorability of Florida's Geology to Sinkhole Formation report… "Florida is underlain by several thousand feet of carbonate rock, limestone and dolostone, with a variably thick mixture of sands, clays, shells, and other near surface carbonate rock units, called overburden. Those several thousand feet of carbonate rocks are host to one of the world's most productive aquifers, the Floridan aquifer system. Erosional processes, physical and chemical, have acted upon these carbonate rocks as water flows through them creating fissures and cavities within the rock. Those erosional processes have created Florida's karst topography, which is characterized by the presence of sinkholes, swallets, caves (wet and dry), submerged conduits, springs, and disappearing / reappearing streams. In June 2012, Florida experienced a mass sinkhole event triggered by record rainfall from Tropical Storm Debby following an extended period of drought. This event led to the formation of hundreds of collapse sinkholes across the state, which resulted in highway and residential road closures, evacuations of homes, and closure of buildings."



Map Source: The Favorability of Florida's Geology to Sinkhole Formation

Vulnerability for Columbia County's Structures, Facilities and Infrastructure

Columbia County's buildings, infrastructure and critical facilities are considered vulnerable to damage caused by sinkhole events. When they strike populated areas or critical facilities, they can be disastrous. If large enough, sinkholes can become disruptive to the point of creating an emergency. From the Sinkhole Formation Report it depicts areas in the State with favorable sinkhole formation (*highlighted in red*). Columbia County's buildings and infrastructure located in Lake City and Southern of the County are at greatest risk. Considerable and significant damage could occur if the County experiences extended period of drought then record rainfall.

Vulnerability for the Columbia County's Population

From the Sinkhole Formation Report it depicts areas in the State with favorable sinkhole formation. The population of residents that live in the Lake City and Southern area of the County are at greatest risk.

Summary details for sinkhole events:

Probability of Future Occurrences	The probability of sinkholes is medium to possible high (at least 1 occurrence every 3 years) for the southern portion of the unincorporated areas of the County, the City of Lake City and the Town of Ft. White.

Geographic Area	The City of Lake City, the Town of Ft. White, and the southern portion of the unincorporated areas of Columbia County) is at medium to possibly high risk to sinkhole events.
Extent	Based on the data recorded by the Geological Society of America, the largest sinkhole in Columbia County was in March 2005. Details reveal that during the first days in March, the largest of the sinkholes was 80 m deep or 262.467 feet deep and the location was latitude 30.17 and longitude -82.71, approximately 16 miles south of the White Springs phospate mine's southern boundary. Note: In reference to the several new sinkholes that opened up in March 2005 were associated with natural depressional, pond-cypress wetlands, which are known to be aligned along fracture systems and conneted to the underlying Floridan acquifer.
Impact	The Columbia County community, the residents, structures, and critical facilities can suffer from sinkhole events. As recorded by the Geological Society and reported to the Columbia County Emergency Management in March 2005, the County experienced several large sinkholes. On March 4, 2005, a sinkhole that measured approximately 100 by 235 feet wide and 45 feet deep swallowed a tree and part of an outbuilding beside a home resulting in large cracks that developed in the foundation on the side building attached to the house. According to Columbia County Sheriff's Office, thousands of gallons of water from nearby Pueschel Pond flowed into the hole after the formation. Although sinkholes can have very localized structural impacts, the destruction can have far reaching effects on ground water resources and can change the water chemistry and rates of recharge or run-off in the county.

Hurricane/Tropical Storms

According to NOAA... "hurricanes, known broadly as tropical cyclones, are rotating systems of clouds and thunderstorms that form over tropical or subtropical waters. One of nature's most powerful storms, hurricanes can bring strong winds, storm surge flooding, heavy rainfall that can lead to inland flooding, tornadoes, and rip currents."

A hurricane is a category of tropical cyclone characterized by thunderstorms and defined surface wind circulation. Hurricanes develop over warm waters and are caused by the atmospheric instability created by the collision of warm air with cooler air. Hurricane winds blow in a large spiral around a calm center, which can be 20-30 miles wide.

A tropical storm is a tropical cyclone with maximum sustained winds of at least 39 mph and is classified as a hurricane once winds goes up to 74 miles per hour or higher. Tropical storms are given official names once they reach these wind speeds. When the wind speeds reach 74 mph or greater, a tropical storm is called a hurricane, typhoon, or cyclone based on the storm location.

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes

because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures. In the western North Pacific, the term "super typhoon" is used for tropical cyclones with sustained winds exceeding 150 mph. See Figure 4.15, the Saffir-Simpson Hurricane Wind Scale for specifics on a hurricane's sustained wind speed.

Figure 4.15 - Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
Í	74-95 mph 64-82 kt 119-153 km/h	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt 154-177 km/h	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt 178-208 km/h	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt 209-251 km/h	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt or higher 252 km/h or higher	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: http://www.nhc.noaa.gov/aboutsshws.php

The HAZUS model from the 2010 LMS Plan reveals a 1 in 50-year probability of hurricane force winds affecting any part of Columbia County. Therefore it is concluded that the probability of a hurricane occurring within the incorporated and unincorporated areas of the County is medium.

Table 4.14 – HAZUS-MH Model Prediction

Probability	Wind Gust Peak (mph)	Wind Gust Peak (knots)	Damage Prediction
1 in 10-year	50-65	43-56	Minimal
1 in 20-year	50-65	43-56	Minimal
1 in 50-year	65-80	56-70	Minimal
1 in 100-year	80-95	70-83	Medium

Hurricanes are a seasonal occurrence, with the Atlantic Coast/Gulf of Mexico hurricane season ranging from June 1 to November 30. Although it is rare, tropical storm and hurricane systems may develop outside of the hurricane season. Hurricanes pose a significant threat to Florida, particularly those residents living along the coast.

What Makes a Hurricane Season Active

According to NOAA, Science fact sheet…"Atlantic hurricanes, also called Atlantic tropical cyclones, are intense storms that occur over the North Atlantic Ocean, Caribbean Sea and Gulf of Mexico. Whether an Atlantic hurricane season is active or quiet generally depends upon the large-scale atmospheric and oceanic environment within the main development region, which spans the tropical North Atlantic Ocean and Caribbean Sea."

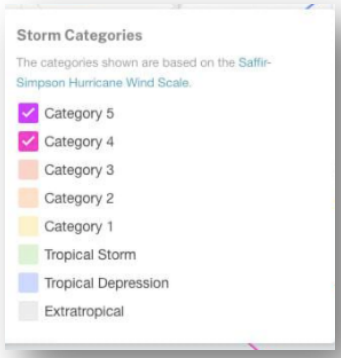
The conditions, which typically are associated with an active Atlantic hurricane season - and can also produce a more intense hurricane include:

- ✓ warmer tropical North Atlantic sea surface temperatures (SSTs);
- ✓ increased thunderstorm activity; and
- ✓ reduced vertical wind shear (changes of wind direction and/or speed with height) within the main development region, among other features.

Tropical Depression to a Tropical Storm

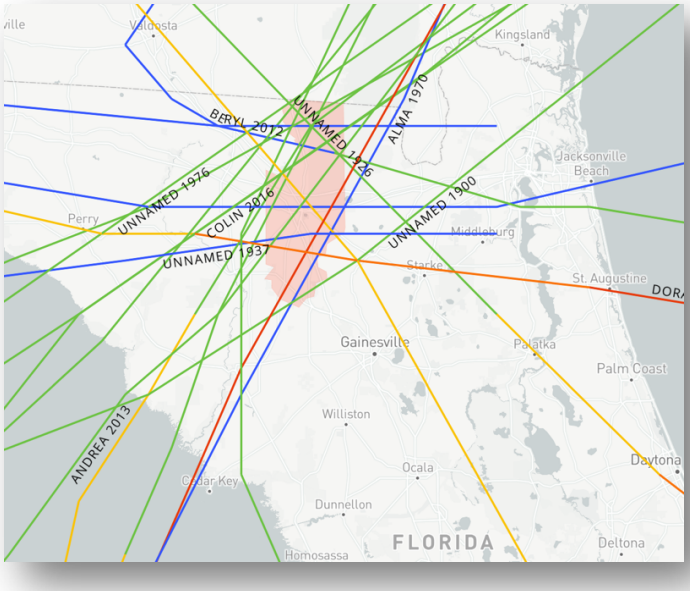
After a group of thunderstorms for a period of time have come together under the right atmospheric conditions, they organize into a tropical depression. The wind speed near the center are between 20 - 34 knots (23 to 39 mph). After a tropical depression has intensified to the point where its maximum sustained winds are between 35-64 knots (39-73 mph), it then becomes a tropical storm. It is at this time that it is assigned a name. During this time, the storm itself becomes more organized and begins to become more circular in shape -- resembling a hurricane.

Figure 4.16 – Key code for Historical Tracks



Details displayed in Figure 4.17, that Columbia County has experienced tropical storms (in green), tropical depression (in purple), and hurricane categories 1, 2, and 3 identified (in yellow, light red, and red).

Figure 4.17 – Historical Tracks of Hurricanes and Tropical Storms over the last 150 years for Columbia County



Source: NOAA, National Ocean Service; https://coast.noaa.gov/hurricanes/#map=8.28/30.211/-82.636&search=eyJzZWFyY2hTdHJpbmciOiJDb2x1bWJpYSBDb3VudHksIEZsb3JpZGEsIFVTQSIsInNlYXJjaFR5cGUiOiJnZW9jb2RlZCIsIm9zbUlEIjoiMTIxMDczMyIsImNhdGVnb3JpZXMiOlsiSDIiLCJINCIsIkgzIiwiSDIiLCJIMSIsIlRTIiwiVEQiLCJFVCJdLCJ5ZWFycyI6W10sIm1vbnRocyI6W10sImVuc28iOltdLCJwcmVzc3VyZSI6eyJyYW5nZSI6WzAsMTE1MF0sImluY2x1ZGVVbmtub3duUHJlc3N1cmUiOnRydWV9LCJidWZmZXJVbml0IjpbIk1pbGVzIl0sInNvcnRZWxlY3Rpb24iOnsidmFsdWUiOiJ5ZWFyc19uZXdlc3QiLCJsYWJlbCI6IlllYXIgKE5ld2VzdCkifSwiYXBwbHlUb0FPSSI6dHJ1ZSwiaXNTdG9ybUxhYmVsc1Zpc2libGUiOnRydWV9

Columbia County is not a coastal county but is still subject to the wind and water damage that hurricanes can bring, although to a lesser extent than a coastal Florida county.

Historical Hurricane and Tropical Storm Occurrences

There were 7 recorded hurricane and tropical storm events reported in Columbia County per the NCDC (1/1/1950 – 12/31/2019) over the last 69 years. Some of the tropical storms were the result of a hurricane event heading inward onto land.

Table 4.15 – Hurricane and Tropical Storm Occurrences in Columbia County (1/1/1950 – 12/31/2019)

Location or County	Date	Time	Type	Death	Injuries	Property Damage	Crop Damage
Columbia (Zone)	9/4/2004	21:00	Tropical Storm	0	0	0.00K	0.00K
Columbia (Zone)	9/25/2004	12:00	Tropical Storm	0	0	0.00K	0.00K
Columbia (Zone)	6/13/2006	06:00	Tropical Storm	0	0	0.00K	0.00K
Columbia (Zone)	8/21/2008	16:00	Tropical Storm	0	0	0.00K	0.00K
Columbia (Zone)	9/1/2016	07:00	Tropical Storm	0	0	0.00K	0.00K
Columbia (Zone)	10/6/2016	07:00	Tropical Storm	0	0	0.00K	0.00K
Columbia (Zone)	9/10/2017	12:00	Tropical Storm	0	0	0.00K	0.00K
Totals:							**N/A**

Hazard Event Narrative – Extent and Impact

1. 9/1/2016, Columbia – At 11:45 pm on 9/1/6, a social media report indicated a tree was blown down onto a car at Hwy 47 S of Lake City. Minor injuries were reported. At 2:15 am on 9/2/16, a wind gust of 43 mph was measured at the Lake City Gateway Airport. Storm total rainfall amounts of 5.77 inches were measured at Oleno State Park. Two mile ENE of the city of Columbia, 3.64 inches were measured.

2. 10/6/2016, Columbia – The peak sustained wind measure at the Lake City Airport was 28 mph on 10/7/16 at 6:15 pm. The peak gust at this location was 41 mph on 10/7/16 at 4:35 pm. At 3:30 pm on 10/7/16 a tree destroyed an occupied mobile home on SE Baya Drive in Lake City. No injuries were reported. Property damage

3. 9/10/2017, Columbia – The Ichetucknee River below Ichetucknee Springs State Park crested at 24.54 feet on 9/16/17 at 1900 EDT. Major flooding occurred at this level. The Santa Fe River at Oleno State Park set a record flood stage at 57.07 feet on 9/14/17 at 0715 EDT. Major flooding occurred at this level. The Suwannee River near Benton crested at 94.47 feet on 9/21/17. Minor flooding occurred at this level. The Santa Fe River at Three Rivers Estates crested at 24.55 feet on 9/16/17 at 2000 EDT. Major flooding occurred at this level. The Suwannee River at White Springs crested at 76.49 feet on 9/13/17 at 0045 EDT. Minor flooding occurred at this level. Storm total rainfall included 8.44 inches about 8 miles SSW of Lake City.

Further details on Tropical Storm Events

In June 2012, Tropical Storm Debby moved across the area from the northeast Gulf of Mexico. Tropical moisture combined with a stalled frontal boundary across north Florida over a period of several days caused extensive flooding and heavy rain with approximately 4.1 inches about 2 miles east of Lake City to over 8 inches in Lake City within a 24-hour period. There were road closures due to standing floodwaters and within a few days a monthly rainfall totaled over

27 inches with approximately 20 inches between about 5 miles northeast of Ichetucknee Springs in Ft. White.

Additional Hurricane and Tropical Storm Occurrences (Disaster Declarations)

Table 4.16 - Disaster Declarations for Columbia County Due to Hurricane and Tropical Storm Events

IA, PA or both	Date – Incident Period	Disaster Event	Incident Type	Declaration #
PA	September 25 – October 7, 1998	Hurricane Georges	Hurricane	1249
PA	August 11 - 30, 2004	Hurricane Charley and Tropical Storm Bonnie	Hurricane	1539
IA, PA	September 3 – October 8, 2004	Hurricane Frances	Hurricane	1545
IA, PA	September 24 – November 17, 2004	Hurricane Jeanne	Hurricane	1561
PA	August 29 – October 1, 2005	Hurricane Katrina Evacuation	Hurricane	3220
PA	August 18 – September 12, 2008	Tropical Storm Fay	Severe Storm(s)	3288
IA, PA	June 23 – July 26, 2012	Tropical Storm Debby	Severe Storm(s)	4068
PA	August 31 – September 11, 2016	Hurricane Hermine	Hurricane	4280
IA, PA	September 4 – October 18, 2017	Hurricane Irma	Hurricane	4337
PA	September 4 – October 18, 2017	Hurricane Irma	Hurricane	3385
PA	October 7 – October 19, 2018	Hurricane Michael	Hurricane	3405
PA	August 28 – September 9, 2019	Hurricane Dorian	Hurricane	3419

Data comparison from NCDC, NOAA data in Table 4.15 to the FEMA Disaster Declaration site in Table 4.16 reveals that none of the hurricanes events and Tropical Storm Debby were recorded in the NCDC county data even though IA and PA was requested by the County. According to the NCDC, NOAA Storm Event Data for Hurricanes and Tropical Storms January 1, 1950 – December 2, 2019, there were 7 tropical storms documented in Columbia County. Table 4.15 provides analysis on date, location, death, injuries, property and crop damage.

Figure 4.18 – Risk Category of Buildings and Other Structures

The Risk Categories I – IV Buildings and Other Structure wind speed maps were created by the Florida Department of Community Affairs, Codes and Standards Division, Applied Research Associates, Inc, Florida Geographic Data Library, Florida Building Code 2010 and the Columbia County Building Department in August 2011.

It categorizes the wind speed risk for buildings, other structures that represent a low hazard (Risk I, 110 mph) to substantial hazard
(Risk III and IV, 130 mph) to human life in the event of failure.

TABLE 1604.5 RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: • Agricultural facilities. • Certain temporary facilities. • Minor storage facilities. • Screen enclosures.
II	Buildings and other structures except those listed in Risk Categories I, III and IV
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. • Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250. • Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500. • Group I-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities. • Group I-3 occupancies. • Any other occupancy with an occupant load greater than 5,000[a]. • Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Risk Category IV. • Buildings and other structures not included in Risk Category IV containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released.
IV	Buildings and other structures designated as essential facilities, including but not limited to: • Group I-2 occupancies having surgery or emergency treatment facilities. • Fire, rescue, ambulance and police stations and emergency vehicle garages. • Designated earthquake, hurricane or other emergency shelters. • Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. • Power-generating stations and other public utility facilities required as emergency backup facilities for Risk Category IV structures. • Structures containing highly toxic materials as defined by Section 307 where the quantity of the material exceeds the maximum allowable quantities of Table 307.1(2). • Aviation control towers, air traffic control centers and emergency aircraft hangars. • Buildings and other structures having critical national defense functions. • Water storage facilities and pump structures required to maintain water pressure for fire suppression.

Vulnerability for Columbia County's Structures, Facilities and Infrastructure

Columbia County's public and private buildings, infrastructure, critical facilities, and some framed homes depending on zone location, and especially the mobile homes in the county. The recorded data for the number of mobile homes in the county is 8,360 (8,140 in unincorporated Columbia County; 112 in the city of Lake City, and 58 in the town of Ft. White). These mobile homes located throughout the county are particularly vulnerable to violent wind damage, which could occur from a major hurricane or tropical storm. The entire county is very vulnerable to heavy and widespread torrential rains, flooding, tornadoes, and lightning strikes which can come from hurricanes and tropical storm events. When strong winds risk category III or IV strike populated areas or critical facilities, they can be disastrous.

Vulnerability for the Columbia County's Population

The County's entire population is vulnerable to a powerful, Category 3 or greater hurricane. The most vulnerable

populations include the elderly persons, small children, chronic invalids, the poor and those residing in mobile homes.

Figure 4.19 – Wind Speed Risk Category I Buildings

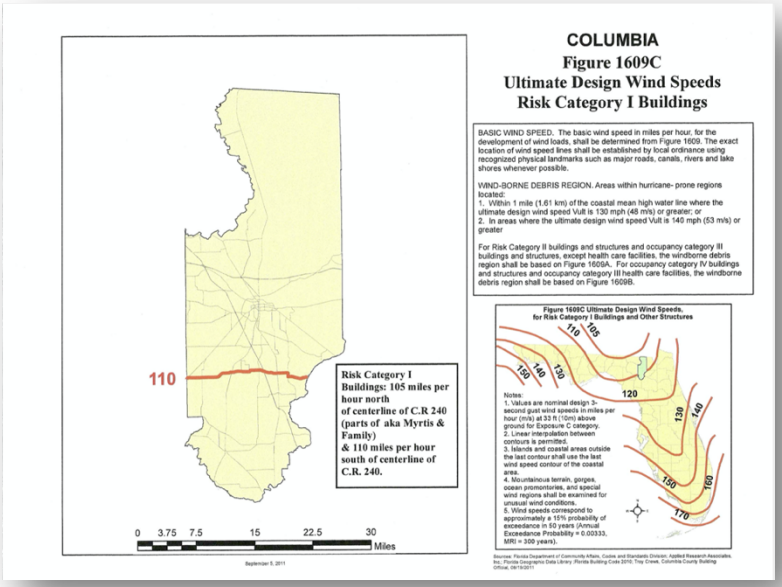


Figure 4.20 – Wind Speed Risk Category II Buildings

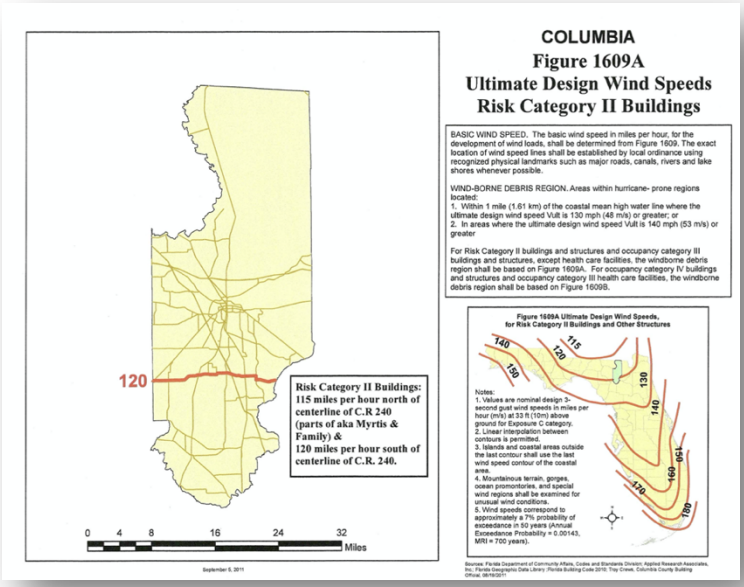
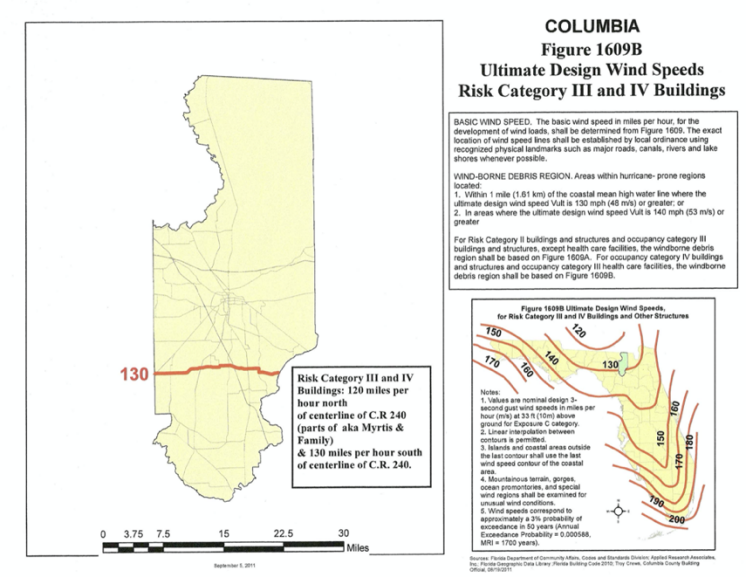


Figure 4.21 – Wind Speed Risk Categories III and IV Buildings



Source: Columbia County; https://www.columbiacountyfla.com/BuildingandZoning.asp

Table 4.17 – Probabilistic Hurricane Wind Count of Structures within the Return Period Areas

Probabilistic Hurricane Wind Count of Structures within Return Period Areas							
	10-Year	20-Year	50-Year	100-Year	200-Year	500-Year	1000-Year
Columbia	11	23	171	800	2,251	5,990	9,685

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.18 – Probabilistic Hurricane Wind Value of Structures within the Return Period Areas

Probabilistic Hurricane Wind Value of Structures Damaged within Return Period Areas (in dollars)							
	10-Year	20-Year	50-Year	100-Year	200-Year	500-Year	1000-Year
Columbia	$116,000	$2,640,000	$14,996,000	$33,904,000	$62,885,000	$140,270,000	$260,035,000

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.19 – Direct Economic Loss for Buildings by Return Period Areas

Direct Economic Loss for Buildings by Return Period by County (in dollars)							
	10-Year	20-Year	50-Year	100-Year	200-Year	500-Year	1000-Year
Columbia	$116,000	$2,644,000	$15,669,000	$36,201,000	$68,824,000	$156,560,000	$297,148,000

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.20 – Probabilistic Hurricane Wind 10-Year, Economic Value

Probabilistic Hurricane Wind 10-Year – Total Economic Value by County (in dollars)						
	Tropical Storm	Category 1	Category 2	Category 3	Category 4	Category 5
Columbia	$3,853,894,751	$0	$0	$0	$0	$0

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.21 – Probabilistic Hurricane Wind 20-Year, Economic Value

Probabilistic Hurricane Wind 20-Year – Total Economic Value by County (in dollars)						
	Tropical Storm	Category 1	Category 2	Category 3	Category 4	Category 5
Columbia	$3,853,894,751	$0	$0	$0	$0	$0

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.22 – Probabilistic Hurricane Wind 50-Year, Economic Value

Probabilistic Hurricane Wind 50-Year – Total Economic Value by County (in dollars)						
	Tropical Storm	Category 1	Category 2	Category 3	Category 4	Category 5
Columbia	$0	$3,853,894,751	$0	$0	$0	$0

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.23 – Probabilistic Hurricane Wind 100-Year, Economic Value

Probabilistic Hurricane Wind 100-Year – Total Economic Value by County (in dollars)						
	Tropical Storm	Category 1	Category 2	Category 3	Category 4	Category 5
Columbia	$0	$3,853,894,751	$0	$0	$0	$0

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.24 – Probabilistic Hurricane Wind 200-Year, Economic Value

Probabilistic Hurricane Wind 200-Year – Total Economic Value by County (in dollars)						
	Tropical Storm	Category 1	Category 2	Category 3	Category 4	Category 5
Columbia	$0	$1,048,747,211	$2,805,147,540	$0	$0	$0

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.25 – Probabilistic Hurricane Wind 500-Year, Economic Value

Probabilistic Hurricane Wind 500-Year – Total Economic Value by County (in dollars)						
	Tropical Storm	Category 1	Category 2	Category 3	Category 4	Category 5
Columbia	$0	$0	$3,853,894,751	$0	$0	$0

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.26– Probabilistic Hurricane Wind 1000-Year, Economic Value

Probabilistic Hurricane Wind 1000-Year – Total Economic Value by County (in dollars)						
	Tropical Storm	Category 1	Category 2	Category 3	Category 4	Category 5
Columbia	$0	$0	$0	$3,853,894,751	$0	$0

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Summary details for hurricane and tropical storm events:

Probability of Future Occurrences	The probability of hurricane and tropical storm events is medium (at least 1 occurrence every 3 years) to potentially high (at least 1 occurrence every 1 year).
Geographic Area	The entire planning area (the City of Lake City, the town of Ft. White, and unincorporated areas of Columbia County) is at high risk to hurricane and/or tropical storm events.
Extent	The worse-case scenario for Columbia county would be a Category 5 hurricane with winds of over 157 mph or higher, a large percentage of framed homes would be destroyed, fallen trees and power poles would isolate residential areas, and power outages would last for weeks to possibly months. Most of the county would be uninhabitable for weeks or months. In reviewing the hurricane and tropical storm track map in Figure 4.17, the track reveals that Columbia County experienced the unnamed 1896 hurricane on 9/22/1896 – 9/30/1896 at a Category 3 hurricane level (111 – 129 mph). Specifics regarding any injuries or property damage were not available.
Impact	The Columbia County community, the residents, structures, and critical facilities, can suffer from hurricane and/or tropical storm events. The impacts associated with hurricanes or tropical storms especially the destructive winds and water, which can be very destructive or catastrophic on the county residential, commercial, and public buildings, as well as the critical infrastructure such as transportation, water, energy, and communication systems. In addition, the economic effect or financial impact could be devastating from a large-scale hurricane event not only during the crisis phase, which immediately follows the event, through the recovery and rebuilding stages. Significant impact on agriculture could also occur with the County's 979 farms and market value of the important crops harvested and livestock.

Tornado

Tornadoes are nature's most violent storms. Spawned from powerful thunderstorms, tornadoes can cause fatalities and devastate a neighborhood in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. Every state is at some risk from this hazard. Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible. Photo source: NOAA

Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

The most common type of tornado, the relatively weak and short-lived type, occurs in the warm season with June being the peak month. The strongest, most deadly tornadoes occur in the cool season, from December through April.

Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Some tornadoes develop rapidly with little advance warning and then may dissipate just as quickly. Most tornadoes are on the ground for less than 15 minutes. Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. It is not uncommon to see clear, sunlit skies behind a tornado.

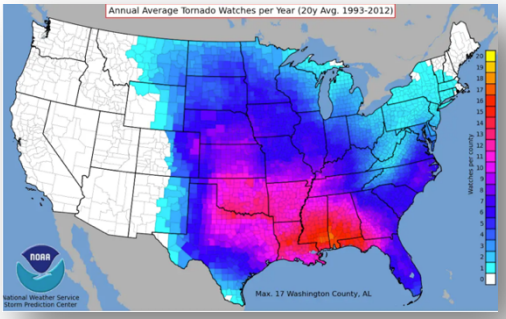


Image Source: http://www.spc.noaa.gov/wcm/20ytora.png

Every state is at some risk from this hazard. Columbia County is vulnerable to these wind disasters due to a high concentration of the population residing in manufactured or mobile homes. A tornado or a series of tornadoes could affect the population if it should occur in a highly populated area. Damage has occurred from tornadoes in the county.

The possible consequences of tornadoes include: power outages, infrastructure damage (road/culvert washout), erosion, property damage/loss from wind, water and fires, fresh-water flooding, evacuations (day/night, road congestion), agricultural damage/loss, economic loss, and debris.

Facts about tornadoes:

- ✓ They may strike quickly, with little or no warning.
- ✓ They may appear nearly transparent until dust and debris are picked up or a cloud forms in the funnel.
- ✓ The average tornado moves Southwest to Northeast, but tornadoes have been known to move in any direction.
- ✓ The average forward speed of a tornado is 30 MPH, but may vary from stationary to 70 MPH.
- ✓ Tornadoes can accompany tropical storms and hurricanes as they move onto land.
- ✓ Waterspouts are tornadoes that form over water.
- ✓ Tornadoes are most frequently reported east of the Rocky Mountains during spring and summer months.
- ✓ Peak tornado season in the southern states is March through May; in the northern states, it is late spring through early summer.
- ✓ Tornadoes are most likely to occur between 3 pm - 9 pm but can occur at any time.

Source: FEMA http://www.fema.gov/hazard/tornado/index.shtm

Definition for Funnel Cloud

A condensation funnel extending from the base of a towering cumulus or Cb, associated with a rotating column of air that is not in contact with the ground (and hence different from a tornado). A condensation funnel is a tornado, not a funnel cloud, if either a) it is in contact with the ground or b) a debris cloud or dust whirl is visible beneath it.

Source: http://www.crh.noaa.gov/glossary.php?word=FUNNEL%20CLOUD

Enhanced Fujita Scale

According to NOAA's National Weather Service (NWS), Storm Prediction Center, the Enhanced Fujita (EF) Scale became operational in February 2007. It is used to assign a tornado a "rating" based on estimated wind speeds and related damage. When tornado-related damage is surveyed, it is compared to a list of Damage Indicators (DIs) and Degrees of Damage (DoD) which help estimate better the range of wind speeds the tornado likely produced. From that, a rating (from EF0 to EF5) is assigned. The EF Scale was revised from the original Fujita Scale to reflect better examinations of tornado damage surveys so as to align wind speeds more closely with associated storm damage. The new scale has to do with how most structures are designed.

The EF Scale is a set of wind estimates (not measurements) based on damage. Its uses 3-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed below. These estimates vary with height and exposure. The 3-second gusts is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, and "one-minute mile" speed.

Table 4.27 - Enhanced Fujita Scale

Fujita Scale			Derived EF Scale		Operational EF Scale	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

NWS is the only federal agency with authority to provide 'official' tornado EF Scale ratings. The objective when measuring a tornado is to assign an EF Scale category based on the highest wind speed that occurred within the damage path. An appropriate damage indicator (DI) from more than one of the 28 used in rating the damage. The construction or description of a building should match the DI being considered, and the observed damage should match one of the 8 degrees of damage used by the scale. A determination will be made within the range of upper and lower bound wind speeds, as to whether the wind speed to cause the damage is higher or lower than the expected value for the particular degree of damage. Several structures are evaluated before a final EF rating is determined.

Table 4.28 - Enhanced F Scale Damage Indicators

Number (Details linked)	Damage Indicator (DI)	Abbreviation
1	Small barns, farm outbuildings	SBO
2	One- or two-family residences	FR12
3	Single-wide mobile home (MHSW)	MHSW
4	Double-wide mobile home	MHDW
5	Apt, condo, townhouse (3 stories or less)	ACT
6	Motel	M
7	Masonry apt. or motel	MAM
8	Small retail bldg. (fast food)	SRB
9	Small professional (doctor office, branch bank)	SPB
10	Strip mall	SM
11	Large shopping mall	LSM
12	Large, isolated ("big box") retail bldg.	LIRB
13	Automobile showroom	ASR
14	Automotive service building	ASB
15	School - 1-story elementary (interior or exterior halls)	ES
16	School - junior or senior high school	JHSH
17	Low-rise (1-4 story) bldg.	LRB
18	Mid-rise (5-20 story) bldg.	MRB
19	High-rise (over 20 stories)	HRB
20	Industrial bldg. (hospital, govt. or university)	IB
21	Metal building system	MBS
22	Service station canopy	SSC
23	Warehouse (tilt-up walls or heavy timber)	WHB
24	Transmission line tower	TLT
25	Free-standing tower	FST
26	Free standing pole (light, flag, luminary)	FSP
27	Tree – hardwood	TH
28	Tree - softwood	TS

Data source: https://www.weather.gov/oun/efscale

Historical Tornado or Funnel Cloud Occurrences

The NCDC (1/1/1950 – 12/31/2019) information reports that for the last 69 years there have been 5 funnel cloud and 20 tornado events in Columbia County. The storm events database documentation notes that the Tornado EF Scale was based on the Enhanced F-Scale.

Table 4.29 – Tornado or Funnel Cloud Occurrences, Columbia County (1/1/1950 – 12/31/2019)

Location or County	Date	Time	Type	Magnitude	Death	Injuries	Property Damage	Crop Damage
Columbia County	5/26/1951	12:30	Tornado	N/A	0	0	25K	0.00K
Columbia County	2/25/1960	5:30	Tornado	F3	0	0	250K	0.00K
Columbia County	5/29/1962	15:00	Tornado	F1	0	0	0K	0.00K
Columbia County	3/21/1974	11:30	Tornado	F2	0	1	25K	0.00K
Columbia County	2/12/1975	10:45	Tornado	F0	0	0	25K	0.00K
Columbia County	8/8/1975	15:45	Tornado	F1	0	2	2.5K	0.00K
Columbia County	8/20/1975	15:00	Tornado	F1	0	0	25K	0.00K
Columbia County	7/19/1977	15:30	Tornado	F0	0	0	2.5K	0.00K
Columbia County	1/23/1980	4:30	Tornado	F0	0	0	25K	0.00K
Columbia County	4/5/1982	18:00	Tornado	F1	0	1	25K	0.00K
Columbia County	4/23/1983	7:30	Tornado	F2	0	2	2.5M	0.00K
Columbia County	8/12/1986	15:15	Tornado	F0	0	0	0K	0.00K
Columbia County	7/23/1987	16:25	Tornado	F0	0	0	.25K	0.00K
Columbia County	9/5/1987	14:30	Tornado	F0	0	0	0K	0.00K
Columbia County	10/11/1990	13:50	Tornado	F0	0	0	0K	0.00K
Lake City	11/7/1995	20:57	Tornado	F1	0	0	500K	0.00K
Lake City	12/10/1997	7:20	Tornado	F0	0	0	5K	0.00K
Lake City	6/3/2003	13:20	Funnel Cloud	N/A	0	0	0K	0.00K
Lake City	11/5/2003	13:20	Funnel Cloud	N/A	0	0	0K	0.00K
Lake City	6/2/2004	16:55	Funnel Cloud	N/A	0	0	0K	0.00K
Lulu	12/25/2006	8:06	Tornado	F2	0	1	0K	0.00K
Lake City	3/7/2008	9:45	Tornado	EF2	1	5	4M	0.00K
Ellisville	5/29/2012	12:40	Funnel Cloud	N/A	0	0	0K	0.00K
Bass	5/15/2014	8:15	Tornado	EF1	0	0	0K	0.00K

Bass	4/19/2019	09:48	Funnel Cloud	N/A	0	0	0K	0.00K
Totals:								**$7,410,250; 1 death; 12 injured**

Source: http://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Tornado

Hazard Event Narrative – Extent and Impact

1. 4/23/1983, Columbia – Gilchrist and Columbia counties are included in the total property damage figure. The tornado first struck north of Bell in Gilchrist County demolishing several mobile homes, one permanent home and an auto repair shop. At Ft. White in Columbia County a brick home was destroyed. Also outbuildings were destroyed, mobile homes destroyed, trees and power lines blown down. Two individuals were injured, details were not available.

2. 11/7/1995, Lake City – One barn was destroyed and there was minor to moderate damage to 20 buildings.

3. 3/7/2008, Lake City – National Weather Service storm survey of the tornado track indicated most damage was EF1 scale with a small area of EF2 damage near NE Denver Street opposite a large field. Numerous trees and power lines were snapped or blown over by the storm. Truck and trailers were also blown over in an industrial park. 19 homes were destroyed, 21 suffered major damage, and 20 had minor damage. Two businesses were destroyed with six suffering major damage. One female fatality occurred when a tree went through her mobile home. A male indirect fatality occurred when trying to connect a power generator. The mesocyclone, which spanned this tornado was tracked across Taylor, Lafayette, and Suwannee counties prior to this touchdown and it later spanned tornadoes in Baker, Charlton and Nassau counties. Five individuals were injured however, further details were not available.

Risk and Vulnerability Assessment

The vulnerability is high (each jurisdiction in Columbia County is likely to experience threat, effect, or reoccurrence of a tornado event).

Vulnerability for Columbia County's Structures, Facilities, and Infrastructure

Columbia County is vulnerable to these extreme wind disaster events due to a high concentration of the population residing in manufactured or mobile homes, 8,360 as of 2020. Tornadoes have caused significant damage to the City of Lake City and Columbia County with over $7,410,250 over the last 40 years. The damage is primarily caused by wind damage to roofs and tree debris impacting transportation and power services. Tornado warnings are issued several times a year and are evenly distributed throughout the County.

Because of their speed of onset and unpredictable paths, all buildings and facilities are considered to be uniformly exposed to this hazard and could be potentially impacted.

Vulnerability for the Columbia County's Population

The entire County is particularly vulnerable to tornados because of the presence of a high number of mobile homes (35%) as a percentage of the housing inventory. Mobile home residents are considered highly vulnerable to hazards both for socioeconomic reasons and because of the limited protection provided by their housing structure.

The possible consequences of tornadoes include: power outages, infrastructure damage (road/culvert washout), erosion, property damage/loss from wind, water and fires, riverine flooding, evacuations (day and night, road congestion), agricultural damage/loss, economic loss, and debris. A tornado or a series of tornadoes could affect the population if it should occur in a highly populated area.

Summary details for tornado events:

Probability of Future Occurrences	The probability of tornado is high (at least 1 occurrence every year).
Geographic Area	The entire planning area (the City of Lake City, the town of Ft. White, and unincorporated areas of Columbia County) is at high risk to tornado events.
Extent	The worse-case scenario for Columbia county would be a EF5 tornado, with destructive winds of 261 – 318 miles per hour, with complete devastation of homes leveled off foundations and swept away; trees debarked; and incredible phenomena would occur. The largest F-Scale in Columbia County was an EF3 on 2/25/1960. Although it was recorded that there was $250,000 in property damage, hazard event narrative specifics were not available. Data reported on 3/7/2008 in Columbia County, an EF2 tornado struck resulting in destruction of many homes and two businesses with over $4,000,000 in property damage; and injured 5 and killed 1 resident.
Impact	The Columbia County community, the residents, the structures, and the critical facilities could suffer from tornado events. The impact of a tornado depends on its strength. Meteorologists use the enhanced Fujita or EF-scale to record the tornado activity to analyze and determine how strong the tornado is. Weak tornadoes may cause only minor damage to property, while a stronger tornado may devastate large parts of an entire town. The impacts associated with tornadoes can be very destructive or catastrophic on the County residential, commercial, and public buildings, as well as the critical infrastructure such as transportation, water, energy, and communication systems. In addition, the economic effect or financial impact could be devastating from a strong tornado event not only during the crisis phase, which immediately follows the event, through the recovery and rebuilding stages. Significant impact on agriculture could also occur with the County's 979 farms and market value of the important crops harvested and livestock. On March 7, 2008 and EF2 tornado battered Columbia County with over $4,000,000 in property damage, 19 homes were destroyed, 21 suffered major damage, and 20 had minor damage. Two businesses were destroyed with 6 suffering major damage. One female fatality occurred when a tree went through her mobile home. A male indirect fatality occurred when trying to connect a power generator.

Severe Thunderstorms - *(includes Strong Winds, Lightning and Hailstorms)*

A thunderstorm is a rain shower during which you hear thunder, and since thunder comes from lightning, all thunderstorms have lightning. There are three basic ingredients needed for thunderstorm development:

- ✓ moisture,
- ✓ an unstable atmosphere, and
- ✓ some way to start the atmosphere moving.

The moisture is necessary to produce the thunderstorm clouds and precipitation. In the summertime, most areas of the United States (US) have sufficient moisture to generate thunderstorms if the other ingredients are present. In the wintertime, thunderstorms favor southern areas of the US where moisture is more plentiful; however, southerly winds associated with well-developed storm systems can bring sufficient moisture northward to generate thunderstorms at any time of the year, even in the dead of winter.

The atmospheric instability plays an important role in thunderstorm development as rising air is needed to produce clouds, and rapidly rising air is needed to produce thunderstorms. For air to rise rapidly, it must become buoyant compared to the surrounding air. When the atmosphere is unstable, the air near the ground can become buoyant and rise rapidly through the atmosphere. And, the warmer the air is near the earth's surface and the colder the air is aloft, the more unstable the atmosphere can be.

The third ingredient needed for thunderstorm development is something that will trigger motion in the atmosphere. This may be some sort of boundary such as a front, heating caused by the sun, or cooling aloft. Once a thunderstorm has developed, it will continue to generate boundaries that can trigger additional storms.

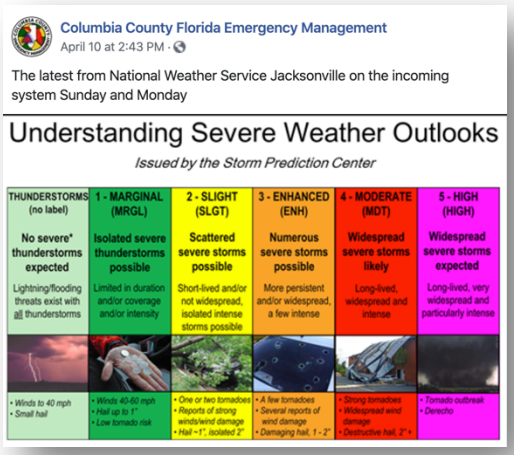
A severe thunderstorm is defined as a thunderstorm containing one or more of the following; hail ¾ inch or greater, winds gusting in excess of 57.5 mph, and/or spawns a tornado. About 10% of thunderstorms are classified as severe and some of the most severe occur when a single thunderstorm affects one location for an extended period of time.

Long-lived thunderstorms are called super cell thunderstorms. A super cell is a thunderstorm that has a persistent rotating updraft. This rotation maintains the energy release of the thunderstorm over a much longer time than typical, pulse-type thunderstorms which occur in the summer months. According to NOAA, super cell thunderstorms are responsible for producing the majority of severe weather, such as large hail and tornadoes. Downbursts are also occasionally associated with severe thunderstorms. A downburst is a strong downdraft resulting in an outward burst of damaging winds on or near the ground. Downburst winds can produce damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can even occur with showers too weak to produce thunder. Strong squall lines can also produce widespread severe weather, primarily very strong winds and/or microburst.

When a severe thunderstorm approaches, the National Weather Service will issue alerts. Two possible alerts are:

- Severe Thunderstorm Watch – Conditions are favorable for the development of severe thunderstorms.
- Severe Thunderstorm Warning – Severe weather is imminent or occurring in the area.

Figure 4.22 – Severe Thunderstorm Risk Categories



Details from the Columbia County EM Facebook page reveal specifics on understanding severe weather. The chart outlines the different types of thunderstorms and describes the risk.

Strong Winds

High winds are very strong winds with air moving from an area of high pressure to an area of low pressure. A high wind warning is defined as 1-minute average surface winds of 35 kt (40 mph or 64 km/hr) or greater lasting for 1 hour or longer, or winds gusting to 50 kt (58 mph or 93 km/hr) or greater regardless of duration that are either expected or observed over land.

Historical Thunderstorm Occurrences

According to the NCDC, from 1/1/1950 to 12/31/2019, there have been over 200 thunderstorms/wind events documented in Columbia County in the last 69 years with an approximate total property damage figure of $457,450.

Table 4.30– Thunderstorm Occurrences in Columbia County (1/1/1950 – 12/31/2019)

Location or County	Date	Time	Type	Magnitude	Death	Injuries	Property Damage	Crop Damage
Columbia County	6/4/1969	15:30	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	5/12/1974	04:30	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	8/16/1974	14:40	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Columbia County	5/24/1980	15:00	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	7/12/1980	17:30	Thunderstorm Wind	60 kts.	0	0	0.00K	0.00K
Columbia County	4/23/1983	08:08	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	11/24/1983	16:20	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia	6/21/1984	17:30	Thunderstorm	0 kts.	0	0	0.00K	0.00K

County			Wind					
Columbia County	2/6/1986	08:45	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	3/14/1986	04:05	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	4/8/1989	21:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Columbia County	5/1/1989	12:01	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Columbia County	6/12/1989	14:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Columbia County	7/13/1989	12:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Columbia County	8/26/1989	14:14	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Columbia County	11/23/1989	02:30	Thunderstorm Wind	65 kts.	0	0	0.00K	0.00K
Columbia County	5/28/1990	12:30	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	6/30/1990	15:45	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	9/9/1990	15:30	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	9/11/1990	13:55	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	3/3/1991	08:15	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	7/8/1992	13:45	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Three River Estates	9/10/1993	17:45	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Lake City	6/24/1994	21:02	Thunderstorm Wind	0 kts.	0	0	5K	0.00K
Lake City	6/25/1994	12:02	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Columbia County	4/11/1995	20:45	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Mikesville	5/11/1995	11;45	Thunderstorm Wind	0 kts.	0	0	0.15K	0.00K
Lake City	5/12/1995	16:43	Thunderstorm Wind	0 kts.	0	0	2K	0.00K
GNV Lake City	7/5/1995	18:10	Thunderstorm Wind	0 kts.	0	0	1K	0.00K
GNV	7/10/1995	14:30	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
GNV	7/10/1995	15:05	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
GNV	7/26/1995	18:10	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Lake City	8/15/1995	15:30	Thunderstorm	0 kts.	0	0	1.50K	0.00K

			Wind					
Ft. White	8/25/1995	07:10	Thunderstorm Wind	0 kts.	0	0	0.50K	0.00K
Lake City	11/7/1995	20:20	Thunderstorm Wind	0 kts.	0	0	2K	0.00K
Lake City	11/11/1995	13:36	Thunderstorm Wind	0 kts.	0	0	55K	0.00K
Lake City	5/27/1997	18:05	Thunderstorm Wind		0	0	0.50K	0.00K
Ft. White	8/30/1997	14:45	Thunderstorm Wind		0	0	0.50K	0.00K
Winfield	9/16/1997	17:43	Thunderstorm Wind		0	0	1.50K	0.00K
Lake City	2/16/1998	23:18	Thunderstorm Wind		0	0	1.50K	0.00K
Ft. White	4/19/1998	13:50	Thunderstorm Wind		0	0	2.50K	0.00K
Columbia County	4/19/1998	13:50	Thunderstorm Wind		0	0	2K	0.00K
Winfield	6/23/1998	14:45	Thunderstorm Wind		0	0	0.50K	0.00K
Lake City	6/25/1998	16:40	Thunderstorm Wind		0	0	1.50K	0.00K
Columbia County	6/25/1998	17:15	Thunderstorm Wind		0	0	15K	0.00K
Columbia County	6/29/1998	18:30	Thunderstorm Wind		0	0	3.50K	0.00K
Lake City	7/12/1998	13:00	Thunderstorm Wind		0	0	1.50K	0.00K
Lake City	8/3/1998	20:30	Thunderstorm Wind		0	0	2.50K	0.00K
Ft. White	9/3/1998	02:00	Thunderstorm Wind		0	0	1.50K	0.00K
Lake City	1/2/1999	21:30	Thunderstorm Wind		0	0	1.50K	0.00K
Lake City	1/23/1999	13:45	Thunderstorm Wind		0	0	1.50K	0.00K
Lake City	2/28/1999	07:05	Thunderstorm Wind		0	0	5K	0.00K
Ft. White	5/10/1999	20:45	Thunderstorm Wind		0	0	1.50K	0.00K
Lake City	6/3/1999	18:45	Thunderstorm Wind		0	0	1.50K	0.00K
Lake City	8/1/1999	16:25	Thunderstorm Wind		0	0	15K	0.00K
Lake City	8/2/1999	20:24	Thunderstorm Wind		0	0	3.50K	0.00K
Ft. White	1/24/2000	08:25	Thunderstorm Wind		0	0	1.50K	0.00K
Lake City	1/24/2000	08:56	Thunderstorm		0	0	1K	0.00K

			Wind					
Lake City	2/14/2000	05:03	Thunderstorm Wind		0	0	3K	0.00K
Ft. White	2/27/2000	05:18	Thunderstorm Wind		0	0	2.50K	0.00K
Lake City	3/26/2000	16:00	Thunderstorm Wind		0	0	0.50K	0.00K
Ft. White	3/30/2000	15:00	Thunderstorm Wind		0	0	3.50K	0.00K
Lake City	3/30/2000	15:35	Thunderstorm Wind		0	0	5K	0.00K
Lake City	6/17/2000	18:30	Thunderstorm Wind		0	0	2.50K	0.00K
Lake City	7/20/2000	16:15	Thunderstorm Wind		0	0	5K	0.00K
Lake City	8/9/2000	17:20	Thunderstorm Wind		0	0	50K	0.00K
Ft. White	8/9/2000	17:30	Thunderstorm Wind		0	0	55K	0.00K
Lake City	8/19/2000	17:00	Thunderstorm Wind		0	0	2.50K	0.00K
Columbia County	8/25/2000	15:55	Thunderstorm Wind		0	0	2.50K	0.00K
Lake City	8/25/2000	16:30	Thunderstorm Wind		0	0	2K	0.00K
Lake City	3/29/2001	10:15	Thunderstorm Wind		0	0	10K	0.00K
Lake City	3/29/2001	10:30	Thunderstorm Wind		0	0	2.50K	0.00K
Lake City	3/29/2001	10:45	Thunderstorm Wind		0	0	15K	0.00K
Benton	6/12/2001	05:47	Thunderstorm Wind		0	0	4.50K	0.00K
Lake City	7/20/2001	15:44	Thunderstorm Wind		0	0	3.50K	0.00K
Lake City	3/31/2002	21:25	Thunderstorm Wind		0	0	0.10K	0.00K
Lake City	4/17/2002	21:00	Thunderstorm Wind		0	0	1K	0.00K
Lake City	5/30/2002	16:45	Thunderstorm Wind		0	0	0.20K	0.00K
Lake City	6/5/2002	17:30	Thunderstorm Wind		0	0	1K	0.00K
Lake City	6/6/2002	15:15	Thunderstorm Wind		0	0	1K	0.00K
Lake City	7/3/2002	17:00	Thunderstorm Wind		0	0	2K	0.00K
Lake City	7/20/2002	13:55	Thunderstorm Wind		0	0	2K	0.00K
Lake City	7/30/2002	14:52	Thunderstorm		0	0	2K	0.00K

			Wind					
Lake City	11/12/2002	11:30	Thunderstorm Wind		0	0	5K	0.00K
Lake City	5/18/2003	16:00	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Ft. White	5/18/2003	16:00	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Ft. White	5/19/2003	15:25	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Ft. White	6/2/2003	17:50	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Lake City	6/16/2003	15:36	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Winfield	6/2/2004	16:35	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Lake City	6/2/2004	16:35	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Lake City	6/2/2004	16:38	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Lake City	6/2/2004	17:00	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Lake City	6/3/2004	15:30	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	6/4/2004	18:30	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	6/19/2004	15:30	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	6/29/2004	18:10	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	8/17/2004	22:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	5/28/2006	17:04	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ft. White	5/28/2006	17:04	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	5/28/2006	17:30	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	6/28/2006	16:12	Thunderstorm Wind	48 kts.	0	0	1K	0.00K
Ft. White	7/27/2006	21:15	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	7/29/2006	19:05	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	8/21/2006	19:45	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ft. White	1/5/2007	19:15	Thunderstorm Wind	50 kts.	0	0	5K	0.00K
Winfield	3/2/2007	04:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Winfield	3/2/2007	04:30	Thunderstorm	50 kts.	0	0	0.00K	0.00K

			Wind					
Winfield	6/4/2007	16:40	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Winfield	7/27/2007	20:50	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ellisville	7/28/2007	16:30	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	8/11/2007	19:55	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Bass	8/12/2007	16:20	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Watertown	2/26/2008	14:20	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
Mason	2/26/2008	14:20	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
Watertown	4/5/2008	12:35	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Benton	6/2/2008	13:40	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Bass	6/9/2008	20:05	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Watertown	6/10/2008	14:45	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Suwannee Vly	7/22/2008	17:47	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Winfield	8/13/2008	13:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	4/2/2009	20:36	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Bass	6/18/2009	16:35	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Country Club Estates	1/21/2010	12:48	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Ft. White	4/30/2010	19:10	Thunderstorm Wind	61 kts.	0	0	0.00K	0.00K
Winfield	5/21/2010	19:00	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
Winfield	5/30/2010	16:25	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Watertown	6/18/2010	15:25	Thunderstorm Wind	45 kts.	0	0	3K	0.00K
Five Pts	9/27/2010	11:27	Thunderstorm Wind	43 kts.	0	0	2K	0.00K
Watertown	4/5/2011	05:05	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Benton	5/14/2011	17:35	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Winfield	6/6/2011	14:57	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K

Lake City	6/6/2011	15:35	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ft. White	8/20/2012	11:40	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Columbia County	12/26/2012	08:40	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Columbia County	2/26/2013	08:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ellisville	2/26/2013	08:00	Thunderstorm Wind	60 kts.	0	0	0.00K	0.00K
Lake City	3/23/2013	12:08	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Bass	3/24/2013	08:47	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
Lulu	6/30/2013	11:30	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Suwannee Vly	8/30/2013	19:06	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	9/11/2013	13:40	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	9/11/2013	13:45	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Five Pts	1/11/2014	16:06	Thunderstorm Wind	54 kts.	0	0	0.00K	0.00K
Winfield	5/11/2014	14:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	6/7/2014	00:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ft. White	6/7/2014	00:22	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Mason	6/22/2014	15:30	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ellisville	7/16/2014	17:47	Thunderstorm Wind	40 kts.	0	0	0.20K	0.00K
Ft. White	11/17/2014	12:24	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Country Club Estates	11/17/2014	12:24	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Bass	11/17/2014	12:24	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	11/17/2014	12:30	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ft. White	2/26/2015	01:05	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Bass	4/13/2015	16:00	Thunderstorm Wind	40 kts.	0	0	4K	0.00K
Ft. White	4/19/2015	15:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	4/19/2015	15:10	Thunderstorm	50 kts.	0	0	0.00K	0.00K

			Wind					
Ft. White	5/31/2015	17:34	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ft. White	5/31/2015	18:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Bass	6/13/2015	16:00	Thunderstorm Wind	45 kts.	0	0	1K	0.00K
Wilburn	6/21/2015	17:56	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
County Club Estates	6/23/2015	13:45	Thunderstorm Wind	45 kts.	0	0	2K	0.00K
Watertown	6/24/2015	16:10	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	6/24/2015	16:10	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Five Pts	6/30/2015	12:20	Thunderstorm Wind	45 kts.	0	0	2K	0.00K
Lake City	6/30/2015	14:12	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	8/7/2015	16:15	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Watertown	8/7/2015	16:22	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Winfield	8/15/2015	19:36	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	4/2/2016	03:40	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ft. White	5/20/2016	09:48	Thunderstorm Wind	45 kts.	0	0	2K	0.00K
Lake City	5/20/2016	10:23	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Watertown	5/20/2016	10:25	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Columbia	7/11/2016	17:01	Thunderstorm Wind	45 kts.	0	0	5K	0.00K
Lake City	7/11/2016	17:14	Thunderstorm Wind	45 kts.	0	0	3K	0.00K
Lake City	7/12/2016	16:57	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	7/12/2016	17:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Watertown	8/14/2016	16:20	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
Windfield	1/6/2017	21:00	Thunderstorm Wind	45 kts.	0	0	2K	0.00K
Suwannee Vly	1/22/2017	17:55	Thunderstorm Wind	50 kts.	1	0	0.00K	0.00K
Ft. White	2/7/2017	21:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K

Lake City	2/7/2017	21:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	2/7/2017	21:18	Thunderstorm Wind	45 kts.	0	0	5K	0.00K
Lake City	2/7/2017	21:20	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
Ft. White	7/11/2017	15:55	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Country Club Estates	7/13/2017	13:58	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Columbia	7/13/2017	14:05	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	7/13/2017	14:10	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	7/13/2017	14:15	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Watertown	7/13/2017	14:18	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Wilburn	6/2/2018	16:05	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Winfield	6/8/2018	14:45	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ft. White	8/17/2018	15:50	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ellisville	8/17/2018	15:53	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Ellisville	8/17/2018	16:01	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Lake City	4/19/2019	09:50	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Watertown	4/19/2019	09:54	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Winfield	4/19/2019	10:00	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
Bass	10/22/2019	12:45	Thunderstorm Wind	45 kts.	0	0	1.5K	0.00K
Totals	**Property Damage (estimates) $457,450; 1 death**							

Source: http://www.ncdc.noaa.gov/stormevents/listevents

Hazard Event Narrative – Extent and Impact

1. 11/23/1989, Columbia – Magnitude 65 kts., Two large trees were uprooted damaging a house roof. Property damage details were not available.

2. 11/11/1995, Lake City – Trees were blown across US 90 East and across Hwy 47 South of CR240. One home was left in shambles and was almost totally destroyed. Property damage was estimated at $55,000.

3. 8/9/2000, Columbia – Roof blown off a home. Property damage was estimated at $50,000.

4. 8/9/2000, Ft. White – Eight homes and one vehicle was damaged. Property damage was estimated at $55,000.

5. 1/22/2017, Suwannee Vly – A large tree was blown down onto a mobile home and split the home in half near I-10 and US Hwy 41. There was 1 fatality. There were additional reports of trees and power lines down across Lake City. Property damage details were not available.

Lightning

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt." This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit in a split second.

Lightning is the second most common storm-related killer in the United States. It causes several billion dollars in property damage each year and kills several dozen people. It is a frequent cause of wildfires and costs airlines billions of dollars per year in extra operating expenses.

Florida has the highest frequency of lightning in the United States. There, sea breezes from the Atlantic Ocean and Gulf of Mexico converge over solar-heated land. This lifts the moist air masses that host thunderstorms. Florida has the highest number of deaths from lightning strikes. The following are facts about lightning:

- Lightning can heat its path through the air to five times hotter than the surface of the sun.
- Lightning strikes the U.S. about 25 million times each year.
- Lightning's unpredictability increases the risk to individuals and property. Most lightning deaths and injuries occur when people are caught outdoors in the summer months during the afternoon and evening and are in open areas or near a tree.
- Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall.
- "Heat lightning" is actually lightning from a thunderstorm too far away for thunder to be heard, however, the storm may be moving in your direction.
- Your chances of being struck by lightning are estimated to be 1 in 600,000 but could be reduced even further by following safety precautions.

Historical Lightning Occurrences

As recorded by the NCDC (1/1/1950 – 12/31/2019), there were 9 recorded lightning events in Columbia County resulting in an injury for three individuals on 6/5/2001 and 1/15/2016; and two deaths, one on 7/17/1996 and the other on 6/16/2003.

Table 4.31 – Lightning Occurrences in Columbia County (1/1/1950 – 12/31/2019)

Location or County	Date	Time	Type	Death	Injuries	Property Damage	Crop Damage
Lake City	6/26/1996	22:00	Lightning	0	0	25K	0.00K
Ft. White	7/17/1996	15:00	Lightning	1	0	0.00K	0.00K
Lake City	6/5/2001	16:00	Lightning	0	2	0.00K	0.00K
Lake City	7/30/2002	14:53	Lightning	0	0	0.00K	0.00K
Ft. White	5/19/2003	14:25	Lightning	0	0	0.00K	0.00K
Lake City	6/16/2003	15:37	Lightning	1	0	0K	0.00K
Watertown	7/31/2013	14:30	Lightning	0	0	.50K	0.00K
Lake City	6/22/2015	14:20	Lightning	0	0	10K	0.00K
Lake City	1/15/2016	07:45	Lightning	0	1	0.00K	0.00K
Totals:	**Property Damage $35,500; 2 deaths, 3 injuries**						

Source: http://www.ncdc.noaa.gov/stormevents/listevents

Hazard Event Narrative – Extent and Impact

1. 6/26/1996, Lake City – more than ten suspect fires were caused by lightning. Property damage was estimated at $25,000.

2. 7/17/1996, Ft. White – a 7-year old boy dies after being struck by lightning while he is playing at O'Leno State Park.

3. 6/16/2003, Lake City - a 16-year old male was killed in a Toyota 4Runner eastbound on Baya Avenue when a lightning bolt stuck a large pine tree. The tree fell on his vehicle and the victim was struck and killed by a branch, which penetrated the front windshield.

4. 1/15/2016, Lake City - A teacher's aide was struck by lightning at Westside Elementary School in Lake City. It was reported that this employee was holding an umbrella and sparks were observed rising from the umbrella. Another staff member was indirectly affected by the lightning strike and reported numbness and tingling. The two were injured but released from a local hospital.

Fires caused by Lightning

As stated in Table 4.33 from the Florida Forest Service, Fires by Causes, data reveals that over the last 20 years lightning has contributed to 117 fires burning 4,946.2 acres in Columbia County.

Hailstorms

Hail is precipitation in the form of lumps of ice produced by convective clouds and typically accompanies thunderstorms. They can grow by colliding with supercooled water drops, which will freeze on contact with ice crystals, frozen raindrops, dust or some other nuclei. Thunderstorms that have a strong updraft keep lifting the hailstones up to the top of the cloud where they encounter more supercooled water and continue to grow. The hail falls when the thunderstorm's updraft can't support the weight of the ice or the updraft weakens and the stronger the updraft the larger the hailstone can grow. Hail can damage aircraft, homes and cars, and can be deadly to livestock and people.

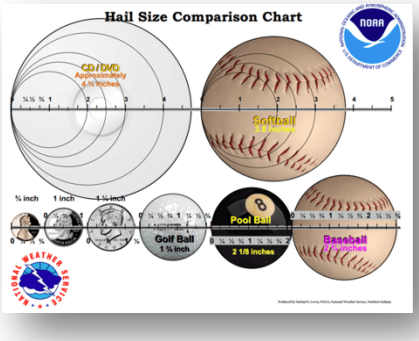


Image Source: NOAA

Historical Hailstorm Occurrences

According to the NCDC, from 1/1/1950 to 12/31/2019, there have been 53 hailstorm events documented in Columbia County with approximately 38% of the hail recorded of 1-inch or over in diameter, the size of a quarter or considered severe.

Table 4.32– Hailstorm Occurrences in Columbia County (4/1/1950 –12/31/2019)

Location or County	Date	Time	Type	Magnitude	Death	Injuries	Property Damage	Crop Damage
Columbia County	4/24/1967	17:20	Hail	1.00 in.	0	0	0.00K	0.00K
Columbia County	6/4/1969	15:30	Hail	1.75 in.	0	0	0.00K	0.00K
Columbia County	3/25/1982	20:45	Hail	1.75 in.	0	0	0.00K	0.00K
Columbia County	4/20/1991	20:30	Hail	1.75 in.	0	0	0.00K	0.00K
Columbia County	3/25/1992	14:10	Hail	.75 in.	0	0	0.00K	0.00K
Columbia County	4/15/1993	13:15	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	5/12/1995	16:13	Hail	.75 in.	0	0	0.00K	0.00K
GNV	7/10/1995	13:30	Hail	.75 in.	0	0	0.00K	0.00K
Columbia County	8/30/1997	14:45	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	2/22/1998	11:49	Hail	.88 in.	0	0	0.00K	0.00K
Lake City	4/8/1998	14:09	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	6/28/1998	17:45	Hail	1.00 in.	0	0	0.00K	0.00K
Columbia County	6/29/1998	18:03	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	1/18/1999	10:55	Hail	.75 in.	0	0	0.00K	0.00K
Columbia County	5/7/1999	10:40	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	5/13/1999	19:15	Hail	.75 in.	0	0	0.00K	0.00K

Lake City	5/20/1999	16:30	Hail	1.75 in.	0	0	0.00K	0.00K
Five Pts.	4/24/2000	17:55	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	5/22/2000	13:55	Hail	.75 in.	0	0	0.00K	0.00K
Mt. Carrie	7/30/2000	17:20	Hail	1.75 in.	0	0	0.00K	0.00K
Columbia County	5/12/2001	15:30	Hail	.88 in.	0	0	0.00K	0.00K
Ft. White	5/30/2001	15:31	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	7/9/2001	19:55	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	5/18/2003	15:25	Hail	2.00 in.	0	0	0.00K	0.00K
Lake City	6/1/2003	17:18	Hail	1.75 in.	0	0	0.00K	0.00K
Columbia County	6/2/2003	18:15	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	6/2/2004	16:45	Hail	.88 in.	0	0	0.00K	0.00K
Lake City	6/29/2004	18:10	Hail	.75 in.	0	0	0.00K	0.00K
Suwannee Vly	3/25/2005	03:50	Hail	1.75 in.	0	0	0.00K	0.00K
Lake City	3/25/2005	09:34	Hail	.88 in.	0	0	0.00K	0.00K
Lake City	3/26/2005	16:00	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	4/30/2005	18:00	Hail	1.25 in.	0	0	0.00K	0.00K
Lake City	6/21/2005	19:13	Hail	.88 in.	0	0	0.00K	0.00K
Lake City	2/3/2006	20:14	Hail	.88 in.	0	0	0.00K	0.00K
Ft. White	7/27/2006	19:30	Hail	1.00 in.	0	0	0.00K	0.00K
Ft. White	7/28/2006	18:15	Hail	1.00 in.	0	0	0.00K	0.00K
Lake City	6/2/2008	14:50	Hail	.75 in.	0	0	0.00K	0.00K
Winfield	6/9/2008	19:00	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	6/18/2008	14:40	Hail	.75 in.	0	0	0.00K	0.00K
Lake City	6/18/2008	14:45	Hail	1.75 in.	0	0	0.00K	0.00K
Bass	7/12/2008	17:02	Hail	.88 in.	0	0	0.00K	0.00K
Lake City	4/2/2009	19:25	Hail	.75 in.	0	0	0.00K	0.00K
Ft. White	4/30/2010	19:12	Hail	1.00 in.	0	0	0.00K	0.00K
Suwannee Vly	5/22/2010	20:10	Hail	1.00 in.	0	0	0.00K	0.00K
Suwannee Vly	5/29/2010	17:00	Hail	.75 in.	0	0	0.00K	0.00K
Benton	5/14/2011	17:45	Hail	1.00 in.	0	0	0.00K	0.00K
Bass	6/6/2011	15:12	Hail	.75 in.	0	0	0.00K	0.00K
Ft. White	6/6/2011	16:00	Hail	1.00 in.	0	0	0.00K	0.00K
Lake City	3/23/2013	12:11	Hail	1.75 in.	0	0	0.00K	0.00K
Bass	5/25/2014	17:42	Hail	.75 in.	0	0	0.00K	0.00K
Bass	3/26/2015	15:15	Hail	1.00 in.	0	0	0.00K	0.00K
Five Pts.	3/26/2015	15:20	Hail	.88 in.	0	0	0.00K	0.00K
Lake City	6/8/2018	14:30	Hail	.88 in.	0	0		
Totals:								**N/A**

Source: http://www.ncdc.noaa.gov/stormevents/listevents

Hazard Event Narrative – Extent and Impact

1. 5/18/2003, Lake City – Hail size 2 inch in magnitude (*between golf ball and pool ball size*). The hail covered the backyard and several large limbs were down. There was no significant property damage reported.

Risk and Vulnerability Assessment

A severe thunderstorm contains either hail one inch or greater and winds gusts in excess of 50 knots (57.5 mph). The thunderstorm/winds have the potential of causing power outages, destruction and damage to buildings and can result in loss of life. Flash flooding from rainfall and strong straight-line winds can knock down trees, and damage mobile homes and roofs. According to the NCDC, there were more than 200 thunderstorm/wind events over the last 69 years (data that was recorded). The magnitude was not identified on 38% of the thunderstorm/wind events, however, the occurrences that did have the magnitude of 50 kts or more was approximately 45%, which would categorize them as severe thunderstorms.

The vulnerability from a lightning occurrence can be disastrous for the county's agricultural land, the structures and to the population. Fires can spark and ignite from lightning and data from the Florida Forest Service over the last 20 years reveal that lightning has contributed to 117 fires that have burned 4,946.2 acres of land in the County. Severe thunderstorms and lightning events together are known to have cost Columbia County 3 deaths, 3 injuries and $492,450 in damages over the last 69 years.

Vulnerability for Columbia County's Structures, Facilities, and Infrastructure

The entire County is vulnerable to severe thunderstorms, lightning and hailstorm events. Due to the unpredictable nature of the storms, and severe storms are completely random, it is not possible to predict specific areas that are more susceptible to events over time. The risks and vulnerability for the City of Lake City and the Town of Ft. White are not substantially different from the risks to the unincorporated county. All buildings and facilities are considered to be uniformly exposed to this hazard and could potentially be impacted. In addition all buildings in the county are vulnerable to lightning and it is impossible to know when or where lightning will strike.

Vulnerability for the Columbia County's Population

The vulnerability to thunderstorm/wind, lightning and hailstorm events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard. The entire county population are at risk and vulnerable to thunderstorm/wind, lightning and hailstorm events, especially the residents that live in mobile homes, which accounts for approximately 35% of the residential inventory, to wind and possibly hailstorm disasters.

Summary details for thunderstorm/strong winds, lightning and hailstorms events:

Probability of Future Occurrences	The probability for thunderstorms with high winds, lightning, and hailstorm events is high (at least 1 occurrence every year).
Geographic Area	The entire planning area (the City of Lake City, the Town of Ft. White, and unincorporated areas of Columbia County) is at high risk to thunderstorm/wind, lightning and hailstorm events. Each jurisdiction had documented thunderstorm/wind events with property damage (i.e. unincorporated Columbia, the City of Lake City, and the Town of Ft. White).

Extent	The worse-case scenario for Columbia county would be the following: The National Weather Service defines a severe thunderstorm as having large hail, at least 3/4 inches (0.75 inches) in diameter, and/or damaging winds, at least 58 mph, or 50 knots. Lightning, no matter how frequently it is striking, is not a criterion for determining whether a storm is severe by national weather service definitions. Extent on County data includes: **Thunderstorms/Wind** - The magnitude extent was 65 kts (approximately 75 miles per hour), which occurred on 11/23/1989. The narrative reveals that two large trees were uprooted and there was damage to a house roof. On 11/11/1995 in Lake City, trees were blown across US 90 East and across Hwy 47 South of CR240. One home was left in shambles and was almost totally destroyed. Property damage was estimated at $55,000. And on 8/9/2000 in Ft. White, eight homes and one vehicle was damaged. Property damage was estimated at $55,000. **Lightning** – two lightning death events occurred in Columbia - the first death was in Ft. White on 7/17/1996 when a 7-year old boy died after being struck while he was playing at O'Leno State Park. The 2nd death occurred in Lake City on 6/16/2003 when a 16-year old male was killed in a Toyota 4Runner eastbound on Baya Avenue when a lightning bolt stuck a large pine tree. The tree fell on his vehicle and the victim was struck and killed by a branch, which penetrated the front windshield. **Hailstorms** - The magnitude extent was 2 inches, a severe hailstorm, (an approximate size of golf ball to a pool ball), which occurred on 5/18/2003. The narrative reveals that hail covered the backyard and several large limbs were down.
Impact	The Columbia County community, the residents, structures, and critical facilities, can suffer from thunderstorm/wind, or lightning and/or hailstorm events. The impacts of severe thunderstorm/wind, lightning and hailstorms can be very destructive on the county residential, commercial, and public buildings. **Thunderstorm/Wind** - The highest property damage figures were $55,000 on two recorded events: On 11/11/1995 in Lake City, trees were blown across US 90 East and across Hwy. 47 South of CR 240. One home was left in shambles and was almost totally destroyed. On 8/9/2000 in Ft. White, eight homes and one vehicle was damaged. **Lightning** - lightning can be dangerous and deadly. Unfortunately, Columbia County has had two deaths caused by a lightning strike. The impact and suffering of a loss of life is unimaginable for all the residents. **Hailstorms** - Although no specifics on property damage were available according to the NCDC, large hailstorm events can produce significant damage to the structures in the county. In addition, the economic effect or financial impact the effects could have a significant impact on agriculture from a devastating severe thunderstorm/wind, or lightning and/or hailstorm event on the County's 979 farms and market value of the important crops harvested and livestock.

Riverine Erosion

Riverine erosion is the long-term process whereby riverbanks and riverbeds are worn away. This process is best described as a river's tendency for constant course alteration, shape and depth change, and the balance between the water sediment transport capacity and the sediment supply.

Riverine erosion has many consequences including land and development loss. When stormwater flows exceed channel capacity, water will overtop channel banks and spread out as floods.

According to the Suwannee River Water Management District (SRWMD) …. "Loss of soils due to riverine erosion under paved roads, bridge abutments and approaches, bridge pilings and other structural pilings, can cause structural failures that endanger public safety. Washouts of boat ramps can restrict access for emergency personnel. Riverine erosion can increase the debris flow of trees and structures like docks that can pile up against structures in the floodway, increasing stresses on the pilings and possibly contributing to failures. It is important to note that the Suwannee River doesn't move a lot and therefore there is minimal riverine erosion."

Photo image: Rum Island Springs County Park

Historical Riverine Erosion Occurrences

Santa Fe River

Rum Island Springs County Park, located at the southern end of the county, offers free access to the Santa Fe River and accommodates paddling (canoes or kayaks), swimming, picnicking and fishing. In September 2019, the Park received two grants from SRWMD to renovate the park and restore the park's riverbank due to erosion.

The bank renovation portion of the project addresses environmental issues at the springs. "The bank restoration, obviously it's a renovation, but over the years with the flooding and stuff we've had and the extended use the park, *there's a lot of erosion along the spring area, and that was one reason the Suwannee River Water Management District worked with us on the grant* — so that we could clean those shores up and get some of the silt that's washed in out of there and clean the river's edge around the spring," Pittman said.

Columbia County Comprehensive Plan (COMP) – Future Land Use Element

As stated in Part II, Columbia County Comprehensive Plan, Section I, Future Land Use Element, Policy I 1.6, 3 The development shall provide a minimum of a 200- foot buffer from adjacent properties, 75- foot undisturbed buffer from a perennial river, stream or creek and a minimum 50-foot setback from a lake, pond or wetland. This buffer may be a portion of the required undeveloped area.

Risk and Vulnerability Assessment

Vulnerability for Columbia County's Structures, Facilities, and Infrastructure

The vulnerability risk to riverine erosion for the County's structures, infrastructure and population is low (the unincorporated area of Columbia County is less likely than average of experiencing a threat or effect of a riverine erosion event) due to Section 4.2.27 from the Land Development Regulations, restricts placement of any structure no closer than 75' to the Ichetucknee River, Olustee Creek, Santa Fe River and Suwannee River.

Vulnerability for Columbia County's Population

There is some vulnerability to the county's population that live near or close by the Suwannee or Santa Fe Rivers, however, the percentage of the county population affected would be relatively small.

Summary details for riverine erosion events:

Probability of Future Occurrences	The probability for riverine erosion is low (at least 1 occurrence every 10 years).
Geographic Area	The area location would be along the Suwannee River, Santa Fe River, Olustee Creek and the Ichetucknee River.
Extent	While it is unknown how many feet of riverfront are lost per year in Columbia County, risk is primarily concentrated along the Suwannee and Santa Fe Rivers. Erosion can result in catastrophic damage to structures if they are located on an eroding shoreline. Also according to the SRWMD, an extreme example of riverine erosion would be a logjam of trees and other debris against a bridge washing the land away and causing the bridge to collapse.
Impact	SRWMD provided a grant for the Rum Island Springs County Park. It was noted that there was a lot erosion and that silt washed in the park area. The grant provided a cleanup in the spring area. Exact specifics on the amount of erosion that had occurred was not available. The Columbia County communities living near the Suwannee River, Ichetucknee River or Santa Fe River could be impacted if a bridge collapsed and residents were unable to use the bridge for transportation.

Wildfires

A wildfire is any uncontrolled fire in combustible vegetation that occurs in the countryside or a wilderness area. Other names such as brush fire, bushfire, forest fire, grass fire, hill fire, peat fire, vegetation fire, veldfire and wildland fire may be used to describe the same phenomenon depending on the type of vegetation being burned.

Wildfires differ from other fires by its extensive size, the speed at which it can spread out from its original source, its potential to change direction unexpectedly, and its ability to jump gaps such as roads, rivers and firebreaks. Wildfires are characterized in terms of the cause of ignition, their physical properties such as speed of propagation, the combustible material present, and the effect of weather on the fire.

Florida's ecosystems are dependent on natural fire. These low intensity fires re-nourish soil, thin abundant vegetation, and provide proper conditions for reproduction and forage. However, since the early 1950's when Floridians actively began to suppress all fires to protect newly planted forest areas and keep newly built dwellings safe, vegetative fuel has become dense and thick. Natural fires have given way to dangerous wildfires, which often damage rather than benefit natural surroundings.

The growing number of people relocating to Florida adds to the wildfire problem as nearly 1,000 people move to Florida each day. Additionally, Floridians who are tired of big-city life are moving to rural areas to "get back to nature". Many of them choose to live in areas where natural vegetation meets homes and communities. These areas are called the Wildland-Urban Interface, and many of these new residents are unaware of the natural role of fire in Florida and therefore are unprepared.

Wildland-Urban Interface fires are fast moving fires that often require many pieces of fire-fighting equipment, and suppression is a difficult and time-consuming operation. Wildfire suppression must also take on the challenge of home protection during almost every fire that is detected. The cost of these operations grows proportionally with their complexity.

Historical Data Occurrences of All Types of Fires – Florida Forest Service (1/1/2000 – 4/17/2000)

Table 4.33 reports statistics from the Florida Forest Service, Fires by Causes, over the last 20 years reveals that 1,369 fires occurred burning over 51,426.2 acres In Columbia County. The acreage data is somewhat imbalanced due to a *prescribed fire called the Impassable fire*, which occurred in March 2004 became a wildland fire that grew to approximately 34,318.4 acres, see details on this fire below.

Table 4.33 – Fires by Causes
Columbia County (1/1/2000 – 4/17/2000)

Cause	Fires	Percent	Acres	Percent
Campfire	19	1.39	90.2	0.18
Children	45	3.29	66.9	0.13
Debris Burn *	120	8.77	502.1	0.98
Debris Burn – Authorized	30	2.19	34579.7	67.24

Broadcast/Acreage			**(34,318.4 - **)**	
Debris Burn – Authorized – Piles	45	3.29	176.3	0.34
Debris Burn – Authorized – Yard Trash	170	12.42	291.7	0.57
Debris Burn – Non-Authorized Broadcast/Acreage	39	2.85	240.2	0.47
Debris Burn – Non-Authorized – Piles	91	6.65	174.8	0.34
Debris Burn – Non-Authorized – Yard Trash	134	9.79	379.2	0.74
Equipment Use *	38	2.78	89.2	0.17
Equipment – Agriculture	39	2.85	427.6	0.83
Equipment – Logging	9	0.66	4.8	0.01
Equipment – Recreation	4	0.29	2.6	0.01
Equipment – Transportation	21	1.53	91.6	0.18
Incendiary	67	4.89	2,430.4	4.73
Lightning	117	8.55	4,946.2	9.62
Misc. – Breakout	8	0.58	191.2	0.37
Misc. – Electric Fence	2	0.15	95	0.18
Misc. – Fireworks	7	0.51	17.9	0.03
Misc. - Power Lines	63	4.60	151.3	0.29
Misc. – Structure	4	0.29	0.8	0.00
Misc. – Other	85	6.21	248.6	0.48
Railroad	5	0.37	377.9	0.73
Smoking	10	0.73	18.8	0.04
Unknown	197	14.39	5,831.2	11.34
Total	**1,369**		**51,426.2**	

Source Florida Forest Service: http://tlhforucs02.doacs.state.fl.us/fmis.publicReports/FiresByCause.aspx

* Fire cause no longer used

** Impassable Fire details - According to the report prepared by the Osceola Ranger District, National Forests in Florida Compartments 16 and 117, Escaped Fire Review …"On March 2, 2004, a prescribed fire was ignited in Compartments 16 and 117 of the Osceola Ranger District, National Forests of Florida. Statements indicate the fire burned outside the parameters of the burn plan within hours of initial ignition. On March 7, 2004, at 8:21 pm the fire was declared an escaped burn moving from the prescribed area onto Florida Division of Forestry (DOF) lands. The *planned 1,500-acre prescribed fire became a wildland fire that grew to over 34,200 acres* across federal, state, and private lands."

A review team was assembled to determine the factors that led to the escape and analysis revealed that the planning and implementation of the prescribed fire as implemented (combining Compartments 16 and 117 into one prescribed burn) were not in compliance with Forest Service standards and procedures.

Historical Data Occurrence - (*details from the Community Wildfire Protection Plan (CWPP))*

Three major fires - The Benton/Benton Grade Fires of 2000, The Impassable Bay Fire of 2004 and The Bugaboo Fire of 2007 burned a total of **69,999 acres**, a heavy impact on Columbia County. The Impassable Bay Fires of 2004 and 2011 and The Bugaboo Fire of 2007 had a heavy impact on Columbia County however most of the acreage was in the National Forest and is not reflected in FFS total acreage reporting.

Historical Wildfire Occurrences from NCDC

According to the NCDC, 1/1/1950 – 12/31/2019 there were 12 wildfire occurrences reported in Columbia County with location, date, time, the type of event, if there were any deaths or injuries, and the property and crop damage estimates.

Table 4.34 – Columbia County Wildfires (1/1/1950 –12/31/2019)

Location or County	Date	Time	Type	Death	Injuries	Property Damage	Crop Damage
Lake City	7/10/1998	00:01	Wildfire	0	4	0.00K	0.00K
Countywide	4/14/1999	16:00	Wildfire	0	0	0.00K	0.00K
Countywide	4/25/1999	11:00	Wildfire	0	0	0.00K	0.00K
Countywide	5/3/1999	11:00	Wildfire	0	1	0.00K	0.00K
Countywide	5/4/1999	11:00	Wildfire	0	0	0.00K	0.00K
Countywide	5/12/1999	12:00	Wildfire	0	0	0.00K	0.00K
Countywide	5/18/1999	12:00	Wildfire	0	0	0.00K	0.00K
Columbia (Zone)	5/8/2007	13:00	Wildfire	0	0	10.600 M	0.00K
Columbia (Zone)	6/1/2011	00:00	Wildfire	0	0	0.00K	0.00K
Columbia (Zone)	7/1/2011	00:01	Wildfire	0	0	0.00K	0.00K
Columbia (Zone)	5/6/2012	07:00	Wildfire	0	0	0.00K	0.00K
Columbia (Zone)	3/28/2017	16:53	Wildfire	0	0	0.00K	0.00K
Total						**$10,600,000; 5 injured**	

Source: http://www.ncdc.noaa.gov/stormevents/listevents

Hazard Event Narrative – Extent and Impact

1. 5/8/2007, Columbia Zone – Lightning strikes on May 5 which ignited two 11-acre and 21-acre fires on Bugaboo Island in the southern Okefenokee National Wildlife Refuge (southwest of Stephen Foster State Park). On the 8th through the 10th high winds around large coastal low pressure system quickly resulted in extreme fire spread in southern Ware and Clinch counties in Southeast Georgia (the Georgia Bugaboo Scrub Fire).

Photo Source: Forests and Rangelands, Bugaboo Fire

The fires combined and raced southward toward Baker and Columbia counties in north Florida becoming the Florida Bugaboo Scrub Fire. Due to close proximity to large populated areas, most significantly Lake City, Florida the fire generated large media attention and became the dominant fire between Bugaboo Scrub complexes. In the evening on the 8th, Georgia St. Rd 94 and Florida St. Rd 2 (one road with two designations) were closed from Moniac, to Fargo, Georgia due to the threat of the Bugaboo Scrub fire crossing and St. Rd 2 poor visibility because

of smoke in the area. By 4:00 pm, 500 people were evacuated from the vicinity of Taylor, Florida in northern Baker County and others were evacuated near Moniac, Georgia.

The focus the fire-fighting efforts from May 8 – May 10 was on structure protection in the Taylor and Baxter, Florida area. Fire crews, along with private timber companies, were working along the flanks of the fire where conditions allowed, as well as, working to protect structures. Fire crews and forest industry personnel were also strengthening lines on the SW edge of the Georgia Bugaboo Scrub near Fargo. The Southern Area Blue Team assumed responsibility of the Florida Bugaboo Scrub Fire, South of St. Rd 2 on May 10 at 10:00 am. At this point the fire had burned nearly 26,746 acres.

From May 10 to May 13, the fire burned SW toward Deep Creek and Lake City in Columbia County causing evacuations in those areas and sporadic closings of I-10 and I-75 in the area. By May 13, the Florida Bugaboo Scrub Fire had burned 102,000 acres and Georgia Bugaboo had burned 131,718 acres, the totals for both were 233,718 acres and 570 persons were forced from their homes. Smoke from these large fires produced hazy conditions as far south as Miami over the weekend. On May 14, around 4:00 pm, the fire jumped containment line in the Fairview Road area east of US 441, about five miles north of the Deep Creek community but was contained overnight. At this time the fire was considered to be 50% contained. On May 15, a critical day for firefighters as wind gusted to 18 mph, with low humidity and higher temperatures making containment the fire more difficult.

The fire was located about 8 miles north of I-10 and 1.5 miles east of US Hwy 441. While no homes were damaged or destroyed, the fire burned to within a mile of the closest homes, which were located on Omar Terrace, about a mile E of US 441 and the Deep Creek community. At this point, there are some 300 homes were evacuated affecting approximately 1,000 people, with 48 structural fire units were situated around 350 homes in the immediate area of the fire to prevent loss. By Tuesday evening, the Florida portion of the Bugaboo Fire had increased to 119,501 acres and was 50% contained. After this point, the fire remained within containment with burnout operations continuing around the perimeter through the remainder of the month. Rains from Tropical Storm Barry (June 1 – June 2) aided with fire control efforts.

2. 7/10/1998, Lake City – Florida's wildfires began on May 25, 1998 and burnt parts of Northeast Florida. A large area of high pressure settled over Florida in the late Spring, keeping the traditional thunderstorms from forming. Lightning sparked most of the brush fires in hard to reach dry woods. Total cost across Northeast Florida will exceed $200 million. Four individuals were injured in the County however, specifics were not available as to the injuries.

Additional Wildfire Occurrences (Disaster Declarations)

Table 4.35 - Disaster Declarations for Columbia County Due to Fires

IA, PA or both	Date – Incident Period	Disaster Event and Incident Type	Declaration #
IA, PA	May 25, - July 22, 1998	Fires	1223
PA	April 15 – May 25, 1999	Fires	3139
PA	June 5, 2000	Fires	2306

The Florida Forest Service encourages all Florida residents to become involved in their program areas of prevention addressing the wildfire issues in the state.

Prevention

- The Fire Prevention Program – Smokey Bear remains an active part of our overall prevention message, but our work goes beyond Smokey.
  - *Smokey Bear actively visits the schools in Columbia County to promote wildfire safety and the benefits of fire prevention*.
- The Firewise Communities Program educates homeowners and community professionals about creating defensible space around their homes, helping to protect them from the dangers of wildfire.

  The program is based upon two principles:

  1. Homeowners must take responsibility for home fire safety and become "partners" with the fire protection agencies, and
  2. Homes (neighborhood an communities) can be designed, built and maintained to withstand a wildland fire without the intervention of a fire department.
  - *Columbia County addresses issues relating to firewise communities in the Community Wildfire Protection Plan (CWPP).*
- *Columbia County Department of Emergency Management provides information on their website for the county citizens about the fire facts and having a firewise home.*
- Prescribed Fire is a cost-effective tool to reduce fuel buildups, which can cause dangerous wildfire conditions. The use of prescribed fire provides increased protection to people, their homes and the forest.

Consequences of a Wildfire

There are many types of causes that can start a wildfire, from lightning, to incendiary, to smoking in forested areas or improperly extinguishing campfires, etc. Prevention efforts include working not only educating people on forested areas, but also working with the Florida Forest Service and having the community citizens become a firewise community for preventative measures in protection from a wildfire. Consequences for a wildfire can be the following, see Table 4.36.

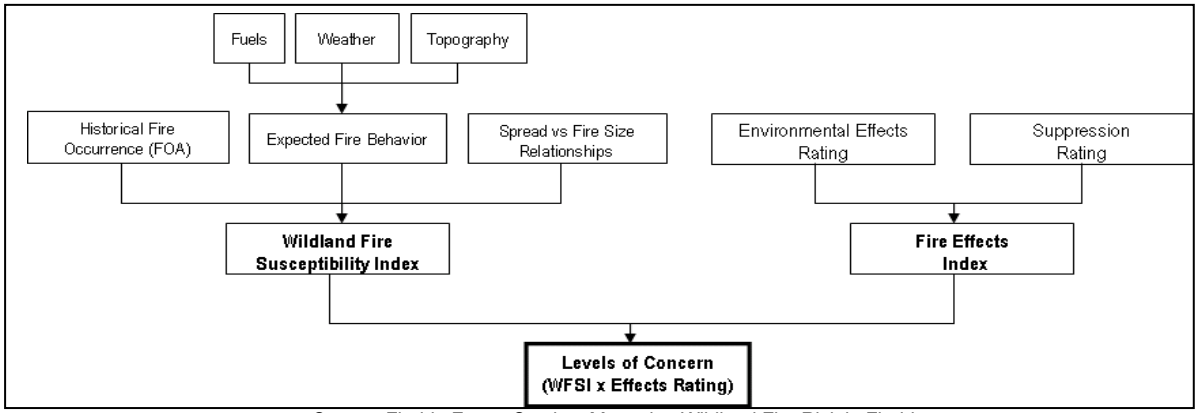
Table 4.36 - Consequences of Wildfires

Infrastructure	Environmental	Human	Vegetative	Economic
power outages	erosion	smoke inhalation	crop damage	business disruption
water/gas/ communication lines	wildlife destruction	personal injury	timber damage	property loss

disrupted				
road closures	habitat loss	human evacuation	species endangered	economic loss
roadway destruction	species endangered	animal evacuation	invasive species increased	suppression cost

The Florida Forest Service levels of concern (LOC) measures wildland fire risk (Figure 4.23). The level of concern is calculated from the probability or likelihood of an acre burning (Wildland Fire Susceptibility Index), and the expected effects of the fire (Fire Effects Index). The Fire Response Accessibility (FRA) Index is a measure of the initial attack response time to a cell from existing initial dispatch locations for fire protection resources. Taken as a pair, these two indices (LOC and FRA) define a cell's accessibility and its vulnerability to wildland fire occurrence and effects. As a result, non-burnable areas and 9 LOC categories ranging from low concern to high concern were assigned. The LOC results can be used to identify areas where mitigation options may be of value.

Figure 4.23 Wildfire Level of Concern Variables

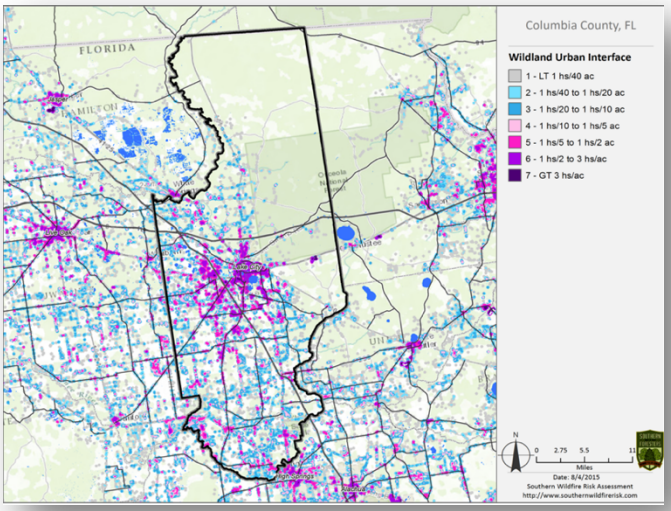


Source: Florida Forest Service, Managing Wildland Fire Risk in Florida; https://www.fs.fed.us/pnw/pubs/gtr802/Vol2/pnw_gtr802vol2_brenner.pdf

Risk and Vulnerability Assessment

Figure 4.24 – Columbia County Wildland Urban Interface (WUI)

The wildfires that burned in Florida in the last several years are examples of the increasing wildfire threat which results from the Wildland Urban Interface (WUI). The Wildland Urban interface is defined as the area where structures and other human development meet with undeveloped wildland or vegetative fuels (FEMA). As residential areas expand into relatively untouched wildlands, people living in these communities are increasingly threatened by forest fires. Figure 4.24, map identifies the WUI for Columbia County.



Source: Columbia County CWPP

Figure 4.25 – Key Code for Columbia WUI and Population

	Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
1	LT 1hs/40ac	1,170	1.8%	58,754	32.3%
2	1hs/40ac to 1hs/20ac	1,579	2.4%	27,108	14.9%
3	1hs/20ac to 1hs/10ac	5,227	7.8%	36,071	19.8%
4	1hs/10ac to 1hs/5ac	7,755	11.6%	26,483	14.5%
5	1hs/5ac to 1hs/2ac	15,628	23.4%	21,161	11.6%
6	1hs/2ac to 3hs/1ac	31,243	46.8%	12,354	6.8%
7	GT 3hs/1ac	4,138	6.2%	239	0.1%
	Total	**66,740**	**100.0%**	**182,169**	**100.0%**

Details from the CWPP: The following SouthWRAP table shows the WUI population and acres for each housing-density category within the county. The housing-density categories 4-7 combined, account for 58,764 people, or 88% of the county WUI population living in wildfire hazard areas classified as WUI Community Protection Zones (CPZs). CPZs then, represent those areas considered the highest priority for community assessments, wildfire hazard mitigation and risk reduction, and protection activities.

Source: Columbia County CWPP

Vulnerability for Columbia County's Structures and Facilities

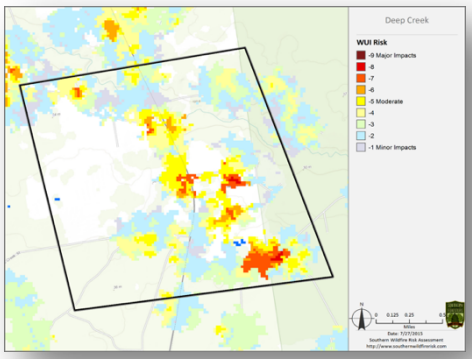
Columbia County's buildings, infrastructure and critical facilities are considered very vulnerable to damage caused by wildfires.

2019 Community Wildfire Protection Plan (CWWP) Update

The Florida Forest Service maintains data in the Southern Wildfire Risk Assessment Portal which indicates each WUI Community Protection Zones (CPZ) wildland and structural vulnerabilities to threats of both direct fire and ember exposure. The primary CPZs represent those areas considered the highest priority for mitigation planning, wildfire prevention, risk reduction, and protection activities. The dominant CPZs within Columbia County are the following: Columbia City, Deep Creek, Drew Grade, Ellisville, Five Points, Ft. White, Hollingsworth Bluff, Lake City, Lulu, Mason City, McColskey, Mershon, Mikesville, Mt. Carrie/Osceola Communities, Suwannee Valley, Three Rivers Estates, Wilson Springs, Winfield and Watertown. The vulnerability location maps are noted in the Columbia County CWPP, Appendix C.

Structures in the wildland urban interface zone are vulnerable to ignition by three different ways: radiation, convection, and firebrands (National Wildland Urban Interface Fire Protection Program). Radiating heat from a wildfire can cause ignition by exposure to the structure. The chances of ignition increase as the size of the flames increases, surface area exposed to flames increases, length of exposure time increases, and distance between the structure and the flames decreases.

Figure 4.26 – Deep Creek WUI Risk Index



The Wildland Urban Interface (WUI) Risk Index layer is a rating of the potential impact of a wildfire on people and their homes. The key input, WUI, reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the Wildland Urban Interface and rural areas is key information for defining potential wildfire impacts to people and homes.

In calculating the WUI Risk Rating for Deep Creek, the WUI housing density data is combined with flame length data and response functions to define the potential impacts to homes and people and likely to take place. Fire intensity data is modeled to

incorporate penetration into urban fringe areas so that outputs better reflect real world conditions for fire spread and impact in fringe urban interface areas. With this enhancement, houses in urban areas adjacent to wildland fuels are incorporated into the WUI risk modeling

Vulnerability for the Columbia County's Population

Columbia County had a slow growth rate of 3.2% from 2010 to 2018 with population total in 2018 of 69,721. The % projected assessment for the population growth from 2018 to 2020 is 1.9%, or an estimated population total of 71,028. The 2020 – 2025 population projection is expected to increase 4.1% to 73,948 in 2025.

The population most vulnerable to wildfires would be the residents living in close proximity to Columbia County's heavily wooded rural areas. Approximately 88% of the county WUI population living in wildfire hazard areas classified as WUI Community Protection Zones (CPZs). The Columbia County, Wildfire Levels of Concern (LOC) and Figure 4.26 – Columbia County (Deep Creek) WUI Risk, determines wildfire impact levels in the incorporated and unincorporated areas of the County. The population at risk and vulnerable to wildfires is noted in Table 4.37.

Table 4.37– Wildfire Population by Level of Concern Category

County	LOC 1	LOC 2	LOC 3	LOC 4	LOC 5	LOC 6	LOC 7	LOC 8	LOC 9
Columbia	1,757	2,772	11,890	4,439	4,391	5,493	6,176	2,845	2,934

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Specifics from Table 4.37, the highest vulnerability for the population would be the level of concern: 3 with 11,890 residents at risk within the population. The topmost risk areas for the population are in the unincorporated areas of the county due to the concentration of residents in rural wooded areas, additional threats to life and property exist, therefore, requiring increased mitigation efforts. This segment of the population could include the mobile home residents which accounts for 35% of the residential structures, the poor, the sick, the elderly, the children, and a segment of the single-family home population living in the unincorporated area of the county.

Summary details for wildfire events:

Probability of Future Occurrences	The probability for wildfire events is high (at least 1 occurrence every year) particularly during drought cycles and very dry conditions. Florida's dry season usually begins in November and continues through May or June, with the driest months being March through May or June. The drought monitor should be watched for the county especially during the Springtime on a daily basis.
Geographic Area	The entire County (the City of Lake City, the town of Ft. White, and unincorporated areas of Columbia County) is highly susceptible to wildland fires based on the heavily forested composition of the county. CWPP report: 379,768 acres or 74.4% of the total land area is woodland or forested land with native trees and shrubs that are vulnerable to fire (private – 249,808 acres/public – 129,960 acres). The Osceola National Forest woodland area is 114,204 acres located on the eastern side of the County.
Extent	Based on the quantitative measurement for wildfires, the extent and worse-case scenario the Benton/Benton Grade Fires of 2000, The Impassable Bay Fire of 2004 and The Bugaboo Fire of 2007 burned a total of 69,999 acres, a heavy impact on Columbia County in a 7-year period.

Impact	The Columbia County community, the residents, and structures suffered from a wildfire event. Based on the data recorded from the "Significant Wildfires in Florida 1981 – 2008", the impact from the Bugaboo wildfire that burned 123,014 acres in Baker and Columbia counties caused over 10 million in property damage in Columbia County, road closures due to smoke and visibility and evacuations for some of the county residents. *Details from NCDC during the Bugaboo Fire on Columbia County* From May 10 to May 13, the fire burned SW toward Deep Creek and Lake City in Columbia County causing evacuations in those areas and sporadic closings of I-10 and I-75 in the area. By May 13, the Florida Bugaboo Scrub Fire had burned 102,000 acres and Georgia Bugaboo had burned 131,718 acres, the totals for both were 233,718 acres and 570 persons were forced from their homes. Smoke from these large fires produced hazy conditions as far south as Miami over the weekend. On May 14, around 4:00 pm, the fire jumped containment line in the Fairview Road area east of US 441, about five miles north of the Deep Creek community but was contained overnight. At this time the fire was considered to be 50% contained. On May 15, a critical day for firefighters as wind gusted to 18 mph, with low humidity and higher temperatures making containment the fire more difficult. The fire was located about 8 miles north of I-10 and 1.5 miles east of US Hwy 441. While no homes were damaged or destroyed, the fire burned to within a mile of the closest homes, which were located on Omar Terrace, about a mile E of US 441 and the Deep Creek community. At this point, there are some 300 homes were evacuated affecting approximately 1,000 people, with 48 structural fire units were situated around 350 homes in the immediate area of the fire to prevent loss.

Community Wildfire Protection Plan (CWPP)

As stated by the Forests and Rangelands… "The Healthy Forests Restoration Act (HFRA) provided communities with a tremendous opportunity to influence where and how federal agencies implement fuel reduction projects on federal lands. A Community Wildfire Protection Plan (CWPP) is the most effective way to take advantage of this opportunity. Additionally, communities with Community Wildfire Protection Plans in place will be given priority for funding of hazardous fuels reduction projects carried out under the auspices of the HFRA."

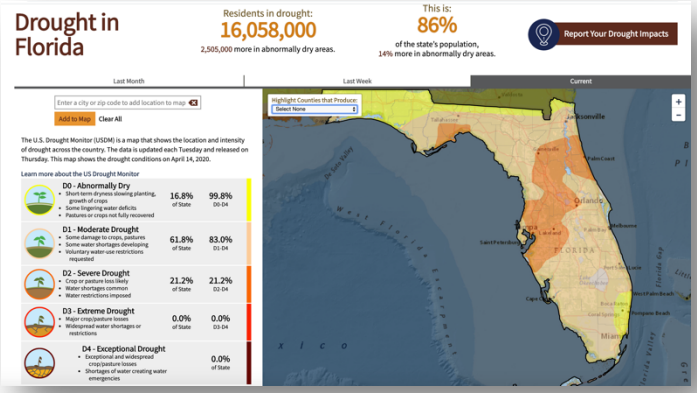
In June 2015 Columbia County established their CWPP; the plan was reviewed and updated in 2019. Located in Appendix C, the plan provides the planning process, vulnerability assessment, the current wildfire protection activities, the CWPP goals and objectives, the action plan, and the implementation and maintenance for the plan.

The CWPP can consolidate knowledge and serve as a single resource for wildland fire risk and hazard mitigation information. Included are an assessment of Columbia County's wildfire vulnerability, local organizations and resources available to assist with wildfire mitigation and response, and a pre-fire action plan for reducing wildfire vulnerability throughout the county. The plan also addresses the challenges of fire protection in the Wildland Urban Interface (WUI) through locally supported proactive solutions and activities, which facilitate the creation of Fire Adapted Communities (FAC).

As populations' increase and development continues to push into the rural wildland areas, it will be necessary to take active steps to reduce the wildfire risk to Columbia County residents. Through the approved CWPP, development regulations, vegetative fuel reduction, and on-going public education programs in high-risk areas, the potential for loss of human life and property from wildfire can be greatly reduced.

Drought and Heat Wave (Extreme Heat)

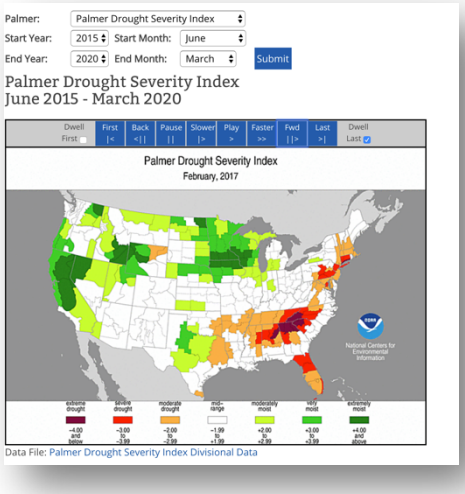
Drought



Drought can be defined based on rainfall amount over some period of time, vegetation conditions, agricultural productivity, soil moisture, levels in reservoirs and stream flow, or economic impacts. In basic terms, a drought is a significant deficit in moisture availability due to lower than normal rainfall. This deficiency results in a water shortage for some activity, group or environmental sector. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

The drought data noted in Table 4.38 was derived from the Palmer Drought Severity Index from NOAA, Climate Monitoring. The Palmer Drought Severity Index (PDSI) is an indicator of the relative dryness or wetness effecting water sensitive economies. The PDSI indicates the prolonged and abnormal moisture deficiency or excess. This indicator is of general conditions and not local variations caused by isolated rain. Calculation of the PDSI is made for 350 climatic divisions in the United States and Puerto Rico. The data collected for the calculations include the weekly precipitation total and average temperature, division constants (water capacity of the soil, etc.) and previous history of the indices.

The PDSI is an important climatological tool for evaluating the scope, severity, and frequency of prolonged periods of abnormally dry or wet weather. It can be used to help delineate disaster areas and indicate the availability of irrigation water supplies, reservoir levels, range conditions, amount of stock water, and potential intensity of forest fires.



Historical Drought Occurrences

According to the Florida Climate Center, *Historic Drought in Florida… "* Because drought is defined on so many different levels, has differing impacts, and can happen on short or long time scales, it is hard to compare one drought to another. An examination of weather records since 1900 reveals that in every decade there has been at least one severe and widespread drought somewhere within Florida. Droughts that began in 1906, 1927, 1945, 1950, 1955, 1961, 1968, 1980, 1984, 1998, and 2006 were the most severe."

Palmer Drought Severity Index (PDSI) Drought Occurrences

The PDSI data for Columbia County on years (January 2011 – April 2020) are as follows:

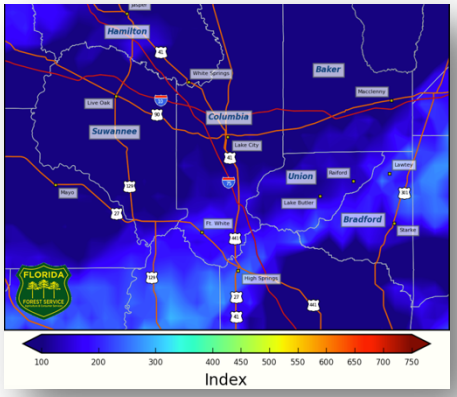
Table 4.38 - Palmer Drought Severity Index Drought Occurrences
January 2011 – April 2020

Years	Data on Drought
2011	There was a recorded period of time in the months of January, April, May, June, July, August, September, October, November and December that had periods of moderate, severe and extreme drought.
2012	There was a recorded period of time in the months of January, February, March, April, May, and June that had periods of moderate, severe and extreme drought.
2013; 2014; May 2015	There was no drought data recorded in the following years 2013, 2014 and (months) January – May 2015.
June 2015	June – December 2015, there was no drought data for the remaining of the year.
2016	There was a recorded period of time in the months of July, August, September, November and December that had periods of moderate drought.
2017	There was a recorded period of time in the months of January, February, March, April and May that periods of moderate and severe drought.
2018	There was no drought data recorded in 2018.
2019	There was a recorded period of time in the months of September, October, and November that had periods of moderate drought.
January – April 2020	There was a recorded period of time in the months of January, February and March that had periods of moderate and severe drought.

Source: https://www.ncdc.noaa.gov/temp-and-precip/drought/historical-palmers/psi/201506-202003

Keetch Byram Drought Index (KBDI)

Figure 4.27 – KDBI, Florida Forest Service



In addition to the drought monitor and PDSI, the county utilizes KBDI, which is updated each day by the Florida Forest Service see Figure 4.27. KBDI is a good indicator of the drought/moisture conditions for agricultural purposes, and it also provides a planning tool for the risks of wildfire. This index provides a numerical scale of 1 through 800, with 800 being the driest and 1 being wettest.

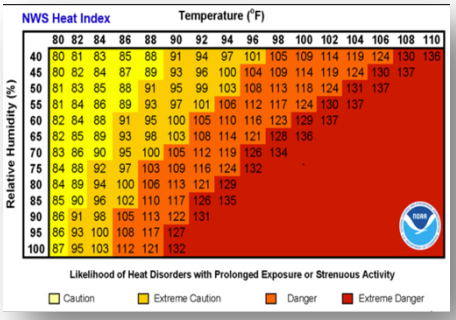
Source: http://currentweather.freshfromflorida.com/kbdi_4km.html

Agriculture is the most vulnerable asset of the County to drought. The direct physical effects of drought in Columbia County typically include poor crops (i.e. corn for grain, corn for silage or greenchop, and crops including nursery and greenhouse), increased fire danger, less water in the soil, streams and reservoirs, and less water available for livestock and wildlife. These lead to indirect effects such as reduced farm income and reduced revenues for vendors and retailers who serve agricultural producers and could present an impact to County.

Heat Wave/Extreme Heat

Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat, or those prolonged excessive heat/humidity episodes. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air nears the ground.

Figure 4.28 - Heat Index Chart



According to the NWS, the “Heat Index” (HI), is sometimes referred to as the “apparent temperature”. The HI, given in degrees F, is an accurate measure of how hot it really feels when relative humidity (RH) is added to the actual air temperature.

To find the HI, look at the Heat Index Chart, Figure 4.28. As an example, if the air temperature is 96°F (found on the left side of the table) and the RH is 60% (found at the top of the table), the HI-or how hot it really feels-is 116°F.

HI values were devised for shady, light wind conditions, exposure to full sunshine can increase HI values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous. Note on the HI chart the shaded zone above 105°F. This corresponds to a level of HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

Columbia County's hot season are the months of June to August with an average temperature of 91.4 °F in the month of July. Heat wave events occurring in the hot season would be in the 100°F plus temperature range. *The hottest temperature recorded in Lake City was 106 °F on June 4, 1918*. Although the relative humidity data was not available, the county is located in a humid subtropical climate zone and at the time, the humidity was probably high. To determine what the Heat Index might have been for this record temperature of 106°F, if the RH was only 50%, the HI would have been 137°F based on the Heat Index Chart.

The heat can kill by taxing the human body beyond its abilities. In a normal year, about 175 Americans die to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the disastrous heat wave of 1980, more than 1,250 people died. Elderly persons, small children, chronic invalids, and those on certain medications or drugs, are particularly susceptible to heat reactions, especially during heat waves in areas where a moderate climate usually prevails.

Small children are incredibly susceptible to heat, especially in a vehicle as it only takes approximately 10 minutes to heat up 19 degrees, so that it can reach lethal temperatures quickly. A child is more susceptible than adults to heat as their bodies heat up 3 to 5 times quicker and can suffer a heat stroke.

Heat Related Occurrence

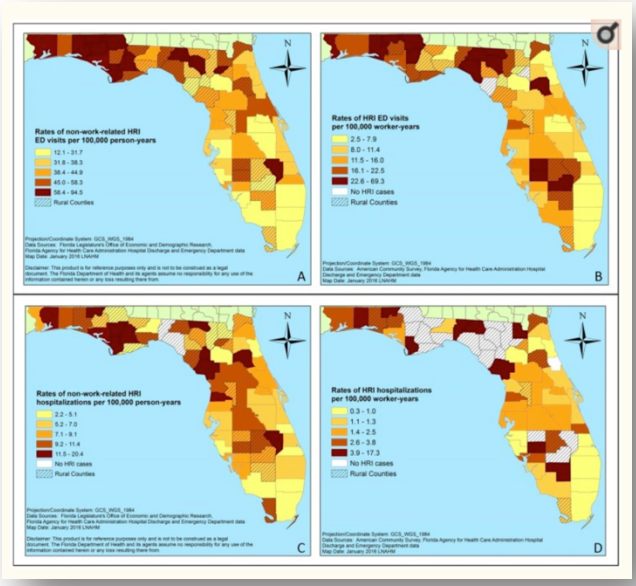
As reported by the International Journal of Environmental Research and Public Health, A Comprehensive Evaluation of the Burden of Heat-Related Illness and Death within the Florida Population, June 2016, among Florida residents, during the Florida warm season (May–October) for 2005–2012, there were 23,981 non-work-related HRI cases treated in the ED, 4816 HRI hospitalizations, and 139 HRI deaths. These cases accounted for 0.10% of all-cause warm season non-work- related ED visits, 0.05% of non-work-related hospitalizations, and 0.02% of non-work-related deaths. Among work-related HRI cases, there were 2979 cases treated in the ED, 415 hospitalizations, and 23 deaths. The work-related HRI cases accounted for 0.66%, 0.98%, and 2.3% of all-cause work-related ED visits, hospitalizations, and deaths during the warm season.

Figure 4.29 demonstrates that Columbia County details are as follows:

- Box A -Rates of non-work related HRI ED visits per 100,000 person-years (31.8 – 38.3 for Columbia); the 2nd lowest category
- Box B - Rates of HRI ED visits per 100,000 worker-years (16.1 – 22.5 for Columbia); the 2nd highest category
- Box C – Rates of non-work related HRI hospitalization per 100,000 person-years (2.2 – 5.1 for Columbia); the lowest category
- Box D – Rates of HRI hospitalizations per 100,000 worker-years (N/A for Columbia)

Figure 4.29 – Statistics on Heat-Related Incident Rates for the Florida Counties

(Box A to the left – top; Box B to the right – top)



(Box C to the left- bottom; Box D to the right- bottom)

Source: International Journal of Environmental Research and Public Health; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4924008/

According to the Florida Department of Health in Columbia County, data related to ED incidents for HRI is not recorded for the county.

Historical Heat Related Occurrence

In May 2015, a young 16-month old child died after she was found in a hot car in Columbia County. The details reveal that she sat in a hot car all day long.

Risk and Vulnerability Assessment

Drought and heat wave events typically impact an area that cannot be confined to any geographic boundaries. The vulnerability and risk to drought and heat wave events can be defined as to the extent to which people will experience harm and potentially property could be damaged from the natural hazard.

During the onset of a drought, which can occur about once in every three years in a given area can result in elevated fire risk and decreased crop growth which could pose a significant threat to the agriculture industry and would be considered a critical risk to the economic vitality of the state's vital agriculture industry.

Vulnerability for Columbia County's Structures and Facilities

Columbia County's buildings, infrastructure and critical facilities are not considered vulnerable to damage caused by drought and heat wave events and therefore estimated property loss would be minimal in the area. It is important to mention that a long-term drought event could present some vulnerability to the water wells, which could present water shortages throughout the county.

Vulnerability for the Columbia County's Population

Columbia County had a slow growth rate of 3.2% from 2010 to 2018 with population total in 2018 of 69,721. The % projected assessment for the population growth from 2018 to 2020 is 1.9%, or an estimated population total of 71,028. The entire estimated population could be affected by a drought or a heat wave event, especially water shortages, which could present a serious problem.

Heat Wave Event

A heat wave event does present a safety threat for the County's population, especially the vulnerable population, the elderly persons, small children, chronic invalids, the sick and those on certain medications or drugs, are particularly susceptible to heat reactions.

The vulnerability to heat depends on climatic factors such as the frequency of heat waves and on individual risk factors, which could include; medical, age, gender, pre-existing disease, use of certain medications, level of hydration, living alone, housing condition, the presence and use of air-conditioning in the home or residential institution. It also can be said that the vulnerability to heat wave could result as a function of sensitivity to exposure, the characteristics of the population, the exposure to heat wave duration and, the measures and actions in place to reduce the loss of life.

Table 4.39 – Estimated % of the Population that could be Affected by a Heat Wave Event

Estimated % of the Columbia County Population that could be affected by a Heat Wave Occurrence	
% of 65 years of age over	18.4% or approximately 12,978 elderly residents (based on data from Table 3.3)
% of children 5 years or younger	6.14%, or approximately 4,328 children (based on data from Table 3.3)
% in poverty, all ages	17.3% or approximately 12,197 residents (based on data from Table 3.5)

Summary details for drought/heat wave events:

Probability of Future Occurrences	The probability for drought or heat wave events is moderate (at least 1 occurrence every 3 years) to potentially high.
Geographic Area	The entire planning area (the City of Lake City, the town of Ft. White, and unincorporated areas of Columbia County) is likely to be uniformly exposed to a drought

	or heat wave event.
Extent	Drought Based on the quantitative measurement for droughts, the extent and worse-case scenario for a drought event would be the drought from 1998 – 2002. As stated by the USGS… " Lower than normal precipitation caused a severe statewide drought in Florida from 1998 to 2002. Based on precipitation and stream flow records dating to the early 1900s, the drought was one of the worst ever to affect the State. In terms of severity, this drought was comparable to the drought of 1949-1957 in duration and had record-setting low flows in several basins. The drought was particularly severe over the 5-year period in the northwest, which included Columbia County where rainfall deficits ranged from 38-40 inches below normal. Within these regions, the drought caused record-low stream flows in several river basins, increased freshwater withdrawals, and created hazardous conditions ripe for wildfires, sinkhole development, and even the draining of lakes." Heat Wave Based on the heat wave data in Columbia County, the hottest temperature recorded in Lake City was 106 °F in June 1918. Although the relative humidity data was not available, the county is located in a humid subtropical climate zone and at the time, the humidity was probably high. To determine what the heat index might have been for this record temperature of 106°F, if the relative humidity was only 50%, the heat index would have been 137°F.
Impact	Drought Droughts can have an impact on the water levels and can last for months or even years. As noted above, although there are many periods of high groundwater levels in the past sixty years, the data shows a continued trend of lower groundwater levels, which could present a significant impact for the entire community. Drought is a prolonged period when there is a precipitation deficit from normal values. The duration of below normal precipitation amounts and their impacts can affect the County's water supplies, agriculture, and the fire danger levels and is measured on the basis of the severity of these impacts. The Columbia County agricultural community and the residents would be impacted from a lengthy and damaging drought event. With over 979 farms in the county and a market value of the agricultural products (crops and livestock) sold of: $40,178,000 (data recorded from the 2017 Census of Agriculture), the effect could be considerable loss in revenue for the county. Heat Wave The Columbia County community and residents would be impacted from a heat wave event with a combination of high temperatures with a high heat index. Elderly persons, small children, special needs, and those on certain medications or drugs, are particularly susceptible to heat reactions, especially during heat waves in areas where a moderate climate usually prevails. Small children are incredibly susceptible to heat, especially in a vehicle as it only takes approximately 10 minutes to heat up 19 degrees, so that it can reach lethal temperatures

	quickly. A child is more susceptible than adults to heat as their bodies heat up 3 to 5 times quicker and can suffer a heat stroke. Unfortunately, in May 2015, a young 16-month old child died after she was found in a hot car in Columbia County. The details reveal that she sat in a hot car all day long.

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Winter Storms/Freezing Temperatures

Winter storms may include extreme cold temperatures (freeze), high winds, snow, and ice, all of which have the potential to impact people, structures, and infrastructure. During the winter, the North Florida region is occasionally invaded by massive cold fronts that originate far to the north and the results are carried to the Southern states. Although the temperature within these air masses rises significantly during their passage to Florida, they are capable of bringing intense cold to the State.

Florida has experienced occasional cold fronts that can bring high winds and relatively cooler temperatures for the entire state, with high temperatures that could remain into the 40s and 50s (4 to 15 °C) and lows of 20s and 30s (-7 to 4 °C) *for few days* in the northern and central parts of Florida, although below-freezing temperatures are very rare in the southern part of the state.

Freezing Temperature Record

The State's record minimum temperature was set in February 1899 when Tallahassee experienced -2° F. Once cold waves move onto the peninsula the relatively warm waters of the Atlantic and the Gulf of Mexico exert their influence, and the airmass' temperature rises.

Not a year goes by when there is not some damage to the citrus or vegetable crop somewhere in the State. Severe freezes in the 19th and 20th centuries gradually drove the center of citrus production southward from the Orlando area to southern Polk County. Winter vegetable growers have long concentrated their production south of Lake Okeechobee, where they gamble each year that their crop will be spared a severe blow from freezes.

Of the dozen or so devastating freezes that have impacted the citrus industry and other agriculture concerns over the last century or in the Southeast, nearly all of them occurred during times of Neutral conditions in the Pacific Ocean, when there is neither El Niño or La Niña present. An in-depth analysis of weather observations from across the Southeast over the last 60 years shows that the risk of severe freezes in Florida is up to three times greater during Neutral conditions in the Pacific Ocean.

Historical Winter Weather Occurrences

According to the NCDC in table 4.40, there was one winter weather occurrence reported in Columbia County over the last 69 years, however, additional data on winter events are noted from other resources.

Table 4.40 – Winter Weather Occurrences in Columbia County – (1/1/1950 – 12/31/2019)

Location or County	Date	Time	Type	Death	Injuries	Property Damage	Crop Damage
Columbia (Zone)	12/26/2010	08:30	Winter Weather	0	0	0.0K	0.00K
Columbia (Zone)	1/3/2018	04:18	Winter Weather	0	0	0.0K	0.00K
Totals:							**N/A**

Source: http://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Winter+Storm

Hazard Event Narrative – Extent and Impact

1. 12/26/2010, Columbia Zone – Low level moisture and strong cold air advection on the west side of a 1000 mb surface low offshore of the Georgia Atlantic Coast brought a wintry mix of snow flurries and sleet during the mid-morning hours to parts of NE Florida. Property damage details were not available.

2. 1/3/2018, Columbia Zone – At 4:18 am, the public reported freezing rain was starting to accumulate on vegetation and vehicles in Lake City. By 9:30 am it was reported that there was an accumulation of 0.25 inches of freezing rain and power outages south of the City. Freezing rain accumulation about 1 mile SE of Lake City caused power lines and tree limbs to fall down. It was estimated about ¼ inch of ice accumulation due to freezing rain in Lake City. Property damage details were not available.

Additional Winter Weather/Freezing Temperature Occurrences

(Recorded data from the following sources: NOAA News; NOAA Southern Region Headquarters; NWS; NCDC, and northfloridanow.com (not direct specific details for Columbia, however, for the entire State for the Storm of the Century).

- ✓ 1/28/2014 - The National Weather Service has placed Duval, Baker, Columbia and Nassau counties under a winter storm watch for Wednesday through Thursday morning as a strong cold front is likely to bring sleet and freezing rain south to Northeast Florida. Forecasters say rain will mix with sleet starting Wednesday morning along and to the north of Interstate 10. A mix of rain, sleet and possible snow is possible in the evening, continuing overnight into Thursday morning. Because temperatures will fall below freezing Wednesday night into Thursday, there is a possibility of ice on the roadways -- especially on bridges and overpasses. This is even more likely inland, especially in the Suwannee River Valley.

- ✓ 2/9/1999 — One hundred years ago this week an arctic blast froze two-thirds of the nation, setting records that stand today. A blizzard paralyzed the Eastern Seaboard and for only the second time in recorded history, the Mississippi River brought ice to the Gulf of Mexico. In Florida, the centennial cold snap brought snow flurries as far south as Fort Myers, with Lake City receiving three inches. Cold swept across the state behind the storm and Tallahassee still holds the state record of 2 below zero on Feb. 13. Freezing temperatures occurred all the way to Miami, which posted a low of 29 degrees on Valentine's Day.

- ✓ 3/13/1993 – The No Name Storm (data from NCDC) - The "Storm of the Century" roared across Florida producing a variety of severe and unusual weather conditions for a period of about 18 hours from late Friday, 3/12 to late Saturday, 3/13. A severe squall line raced eastward at 50 mph ahead of an intense low producing several tornadoes and strong downbursts as it moved through the state and directly causing fatalities. From intense storm surge and flooding on the gulf coast to a period of 8 to 12 hours of high sustained winds of up

to 50 mph with gusts to 70 mph to cold air which poured in behind the intense low with up to four inches of snow falling in the panhandle to a trace to 3 inches elsewhere across north Florida. Record or near record low temperatures occurred over much of the state the following two nights. Total property damage for the State was estimated at $1.6 billion and 47 fatalities, (specific property damage for Columbia County statistics and fatality data was not available).

- ✓ 12/14/1952 - North Florida - Snow and Sleet - Trace of snow or sleet with frozen precipitation occurred before noon in Lake City**.** Temperatures were above freezing and snow or sleet melted as it fell.

- ✓ 12/28/2010 – Lake City - The City residents woke up to record cold temperatures Tuesday morning. The thermometer bottomed out at 18° degrees which broke by six-degrees, the record of 24° set in 1925. Forecasters say the cold weather has one day of life left before temperatures return to normal. The area will remain under a hard freeze warning from 9 o'clock Tuesday night until 9 o'clock Wednesday morning.

- ✓ 12/1/2000 – 1/25/2001 – Columbia County experienced freezing temperatures per FEMA Declaration #1359. Specifics regarding IA or PA was not available.

Risk and Vulnerability Assessment

The vulnerability to winter storms and freezing temperature events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard. A severe winter storm or freeze can have a substantial impact on Columbia County's communities, utilities, transportation systems, telecommunications, and possibly result in loss of life due to accidents or hypothermia.

Ice accumulation accompanied by high winds can have destructive impacts to trees, power lines, road and bridge closures, and utility services. Communications and power are often disrupted while utility companies work to repair the damage. Power and communication disruptions are potential consequences of ice storms and even snow in the county. As confirmed in the probability, the County has limited vulnerability to severe freezes possibly every once in 20 years.

Extended period of time of freezing temperatures further increases the risks of cold weather. Also, injuries or deaths could occur due to the presence of ice on the roadways, and thus putting drivers and utilities, such as power and communication lines, at risk. Strong wind conditions would also help tree limbs with ice weighing on them to fall, which could create power outages or cause injury to property or people. Another source of damages, injuries, or deaths may be related to the incorrect use of heating sources that would create fires.

Freezing temperatures could pose a major hazard to the agriculture industry and are a significant threat to the economic vitality of the state's critical agriculture industry.

Vulnerability for Columbia County's Structures, Facilities, and Infrastructure

Columbia County's buildings, infrastructure and critical facilities could have some impact from a winter storm or freeze event with power interruptions or frozen pipes. Back-up power is crucial for the county's critical facilities and infrastructure. Also, without winterized equipment for snow or ice accumulation this could lead to minor roadway icing and road closures disrupting normal daily activities for the residents.

Vulnerability for the Columbia County's Population

Columbia County had a slow growth rate of 3.2% from 2010 to 2018 with population total in 2018 of 69,721. The % projected assessment for the population growth from 2018 to 2020 is 1.9%, or an estimated population total of 71,028. The entire population would be at risk and vulnerable to winter storm and freezing temperature leaving several homes

without heat or water resulting in shelter needs to assist and care. The most vulnerable residents would be the elderly, the poor, the sick, the special needs, the poor and the mobile home residents.

Table 4.41 – Estimated % of the Population that could be Affected by a Winter Storm/Freeze Event

Estimated % of the Columbia County Population that could be affected by a Winter Storm/Freeze Occurrence	
% of 65 years of age over	18.4% or approximately 12,978 elderly residents (based on data from Table 3.3)
% of children 5 years or younger	6.14%, or approximately 4,328 children (based on data from Table 3.3)
% in poverty, all ages	17.3% or approximately 12,197 residents (based on data from Table 3.5)

Summary details for winter storm/freezing events:

Probability of Future Occurrences	Based on past occurrences, the probability of winter storm and freeze occurrence in Columbia County, is low for winter storms to possibly medium for freezing temperatures (winter storms at least 1 occurrence every 10 years, and freezing temperatures at least 1 occurrence every 3 years).
Geographic Area	The entire planning area (the City of Lake City, the Town of Ft. White, and unincorporated areas of Columbia County) is at risk to winter storms and freezing temperatures.
Extent	19th Century data: Based on historical data for the State of Florida, the coldest temperature ever recorded was 6 °F (−14 °C) on February 13, 1899. 20th and 21st Century data: The coldest temperatures recorded in Lake City was 24° in 1925; and 18° on 12/28/2010. These recorded temperatures would be the extreme and worst-case scenario. The County also suffered the effects from the Storm of the Century in March 1993; and in the incident period (12/1/2000 – 1/25/2001), the County experienced freezing temperatures per FEMA Declaration #1359.
Impact	The Columbia County agricultural community and the residents would be impacted from a lengthy and damaging winter storm/freezing event. With over 979 farms in the county and a market value of the agricultural products (crops and livestock) sold of: $40,178,000 (data recorded from the 2017 Census of Agriculture), the effect could be considerable loss in revenue for the county. In addition, on February 9, 1999, the City of Lake City received three inches of snow from a strong blizzard on the Eastern seaboard. Although details and specifics on property or crop damage was not available.

Future Land Use

Buildout and Safe-Growth Analyses

The LMS Working Group discussed developing a buildout and safe-growth analysis for Columbia County's future planning. It was established that mitigation be evaluated and documented in all planning and inserted into our daily practices. It was determined that not only does the County want to look at how development will occur into the future, but also how development affects the County's risks and incorporate methods to safely grow in the future.

Table 4.42 – Building Inventory by Occupancy Type, 2020

Type of Structure	County (Unincorporated)	City of Lake City	Town of Ft. White
Single Family Residential	11,693	3,091	174
Multi-Family Residential	171	346	2
Mobile Homes	8,190	112	58
Agricultural			
Commercial and Industrial	734	718	51
Government	86	69	9
Institutional	159	103	10
Total	21,033	4439	304

Source: Columbia County Property Appraiser, May 2020

By Florida Statute, counties are required to review and revise their Comprehensive Plan (COMP) every seven years through the Evaluation Appraisal and Review (EAR) process. The LMS Working Group recognizes the importance of incorporating the new EAR as the new data could change future conditions throughout the county in terms of development and thus vulnerability. After a new EAR is formally approved and adopted and during the subsequent review (whether annual or 5-year) of the LMS, the Working Group will evaluate and incorporate any new data as needed into the LMS.

The future land use element from the County COMP outlined is an important aspect in planning a buildout and safe-growth analyses and will be evaluated as amended. In addition, the Future Land Use Map should be viewed along with other important maps for the County.

FUTURE LAND USE GOAL, OBJECTIVES AND POLICIES

GOAL I - IN RECOGNITION OF THE IMPORTANCE OF CONSERVING THE NATURAL RESOURCES AND ENHANCING THE QUALITY OF LIFE, THE COUNTY SHALL DIRECT DEVELOPMENT TO THOSE AREAS WHICH HAVE IN PLACE, OR HAVE AGREEMENTS TO PROVIDE, THE LAND AND WATER RESOURCES, FISCAL ABILITIES AND SERVICE CAPACITY TO ACCOMMODATE GROWTH IN AN ENVIRONMENTALLY ACCEPTABLE MANNER.

OBJECTIVES and POLICIES for URBAN DEVELOPMENT AREAS

Urban development areas are areas within the Designated Urban Development Area ("DUDA") as depicted on the Future Land Use Map of the Comprehensive Plan.

OBJECTIVE I.1 The county shall continue to direct future population growth and associated urban development to urban development areas as established within this comprehensive plan.

Policy I.1.3 The county's future land use plan map shall base the designation of residential, commercial and industrial lands depicted on the future land use plan map upon acreage which can be reasonable expected to develop by the year 2037.

OBJECTIVES and POLICIES for RURAL AREAS

Rural areas are those areas located outside the designated urban development areas shown on the County's Future Land Use Plan Map.

OBJECTIVE I.2. The county shall maintain the rural character of rural areas by limiting development activity to those uses and densities which are identified within the following policies.

OBJECTIVES and POLICIES for both URBAN DEVELOPMENT and RURAL AREAS

OBJECTIVE I.3 The county shall include within the site plan review process to be adopted as part of the land development regulations, that adjacent land uses shall not be adversely impacted by any change in land use.

OBJECTIVE I.4 The county shall identify and designate blighted areas which are feasible for redevelopment or renewal, through the updating of the housing condition survey with the most recent U.S. Bureau of Census, as well as, the latest information provided by the Shimberg Center for Affordable Housing, University of Florida information.

OBJECTIVE I.5 The county shall work towards the elimination or reduction of uses inconsistent with the county's character and future land uses, through establishing such inconsistent uses as non-conformities to be defined within the land development regulations.

OBJECTIVE I.6 The county shall continue to utilize a historic preservation agency to assist the Board of county Commissioners with the designation of historic landmarks and landmark sites or historic districts within the unincorporated area of the county based upon criteria utilized for the National Register of Historic Places and the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. The historic preservation agency shall review applications for historic designation and after conducting a duly noticed public hearing shall make a recommendation to the board of county commissioners based upon the criteria stated in the historic structures maintenance and adaptive reuse policy contained within this future land use element of the comprehensive plan.

OBJECTIVE I.7 The county shall continue to maintain regulations to protect natural resources and environmentally sensitive lands (including but not limited to high groundwater aquifer recharge areas as shown on Illustration A-XI, wetlands and floodplains).

OBJECTIVE I.8 The county shall establish a process for coordination with agencies responsible for the implementation of any regional resource planning and management plan prepared pursuant to Chapter 380, Florida Statutes.

OBJECTIVE I.9 The county shall establish a process for coordination with the water management district of all proposed subdivision plats and site and development plans within the drainage basin of any designated priority water body to provide the water management district an opportunity to review such subdivision plats and site and

development plans to determine if the development is not inconsistent with any approved management plans within that basin.

OBJECTIVE I.10 The county shall approve buildable lots for subdivisions only where the location of development is consistent with United States Department of Interior Geodetic Survey topographic information and soil conditions as identified within the United States Department of Agriculture Soil Conservation Service Soil Survey for the county for the location of structures, unless the soil conditions can be mitigated by installation of drainage systems or removal and replacement with suitable soils.

OBJECTIVE I.11 The county shall require that proposed development be approved only where the public facilities meet or exceed the adopted level of service standard.

OBJECTIVE I.12 The county shall adopt innovative planned residential development regulations. The purpose of the planned residential development regulations is to permit planned residential developments within both the designated urban development areas and rural areas of the county which are intended to:

OBJECTIVE I.13 The county shall insure that existing rights of property owners are preserved in accordance with the Constitution of the United States of America and the State of Florida, by adopting regulations by which a property owner may demonstrate rights which have been vested against the provisions of this comprehensive plan.

OBJECTIVE I.14 The county shall require private sub regional water and sewer facilities, which have been determined to be substandard (as defined in Policy I.14.1) to connect to public regional centralized potable water and sanitary sewer systems when they are within 300 feet of such private sub regional systems.

OBJECTIVE I.15 The county shall define the boundary of the Ichetucknee Trace as the valley containing the Ichetucknee River located in the Central and Southwestern portion of the county, as depicted on the future land use map. More specifically, the area is defined by a two-mile wide corridor running parallel to the trace of the Ichetucknee River from Rose Creek Sink southward to the northern boundary of Ichetucknee Springs State Park. In addition, the area north of Rose Creek Sink also includes the area defined by the 75-foot contour as identified on the United States Department of the Interior, Geological Survey 7.5 minute quadrangle map.

OBJECTIVE I.16 To promote and further the intent of Chapter 333, Florida Statutes, by preventing the encroachment of incompatible development and land uses in the vicinity of general aviation airports. The county shall establish the airport land use restrictions as provided in the airport land use restriction policy of this element.

OBJECTIVE I.17 The location of electrical substations shall be permitted in any land use category, except the conservation future land use category and any historic preservation overlay district as depicted on the future land use plan map. All other essential services, which are hereby defined to include and be limited to electrical transmission and distribution lines, water distribution lines and mains, sanitary sewer collection lines, force mains and lift stations, natural gas transmission and distribution lines and mains, telephone lines and substations and cable television lines shall be exempt from any county approval and shall be permitted in any land use category.

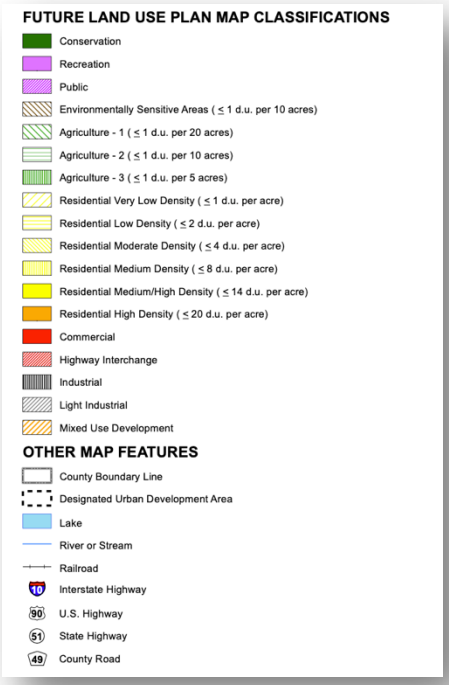
Future Land Use Map (FLUM)

The future land use map is a community's visual guide to future planning. The future land use map should bring together most if not all of the elements of the County's comprehensive plan It is a map of what the community wants to have happen or a visual guide to future planning; it is not a prediction.

The categories in Columbia County's Future Land Use Map, Figure 4.30 are defined as follows in the comprehensive plan.

The Future Land Use Plan Map was amended on August 1, 2019 by Ordinance No. 2019 - 08 identifies the category areas for Columbia County; conservation, recreation, public environmentally sensitive, agriculture 1 – 3, residential (low to high density), commercial, highway interchange, industrial, mixed use development.

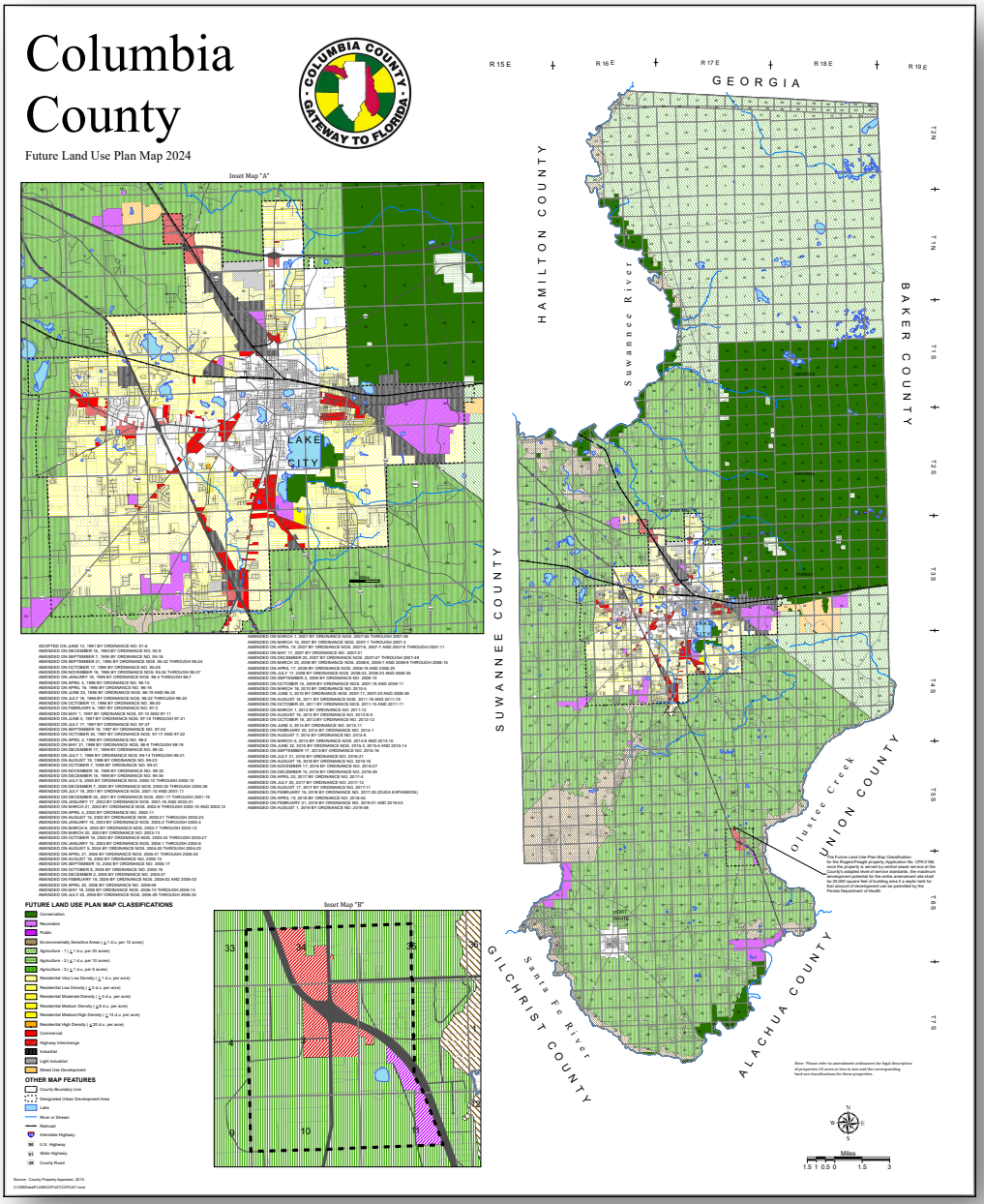
Figure 4.30 - Classifications for the FLUM



The map classification identifies that most of the county is agricultural and conservation. The jurisdictions specific are the City of Lake City and the Town of Ft. white with an overall population growth rate expected to increase at a slow rate of 4.1% over the next five years (2020 – 2025).

The most common land use throughout the county is agriculture which includes mainly timberland or forestland area. Other land uses include the cropland, pastureland, and other agricultural uses in large scale land holdings. In this analysis, the projected land use for the county will remain predominately agricultural and conservation.

Figure 4.31 - Columbia County, Future Land Use Map (FLUM)



Source: Columbia County

As stated, Columbia County's projected growth rate for 2025 is only 4.1% increase in residents. Despite Columbia County's historically slow growth rate, the county still has much room for growth. it is clear that of the hazards with geographic boundaries, the county needs to predominantly consider wildfire and flood in directing future development. These two hazards areas have the highest number of acreage in urbanized areas, as well as the highest potential for additional future losses in the future. The county should however keep all hazard areas in mind when permitting new development, so that development in these areas can be avoided or properly mitigated.

The future land use element indicates maximum densities of four dwelling units per acre. It is recommended that the county explore the possibility of promoting higher density, more compact, clustered, mixed use development in low to no-hazard areas of the City of Lake City and the Town of Ft. White. Doing so will help conserve and efficiently manage resources related to emergency management and hazard mitigation, promote more affordable site-built housing to reduce reliance on mobile homes, and increase development in areas which are not hazardous.

Section 5 – Mitigation Strategy

Requirements:

§201.6(c)(3): Does the Plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs?
§201.6 (c) (3) (i) - The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
§201.6 (c) (3) (ii) A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.
§201.6 (c) (3) (ii) -The mitigation strategy must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate
§201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
§201.6(c)(3)(iv):Does the Plan identify mitigation actions for every hazard posing a threat to each participating jurisdiction?
Requirement 201.6(c)(4)(ii):The updated plan must explain how the jurisdictions incorporated the mitigation plan, when appropriate, into other planning mechanisms as a demonstration of progress in local hazard mitigation efforts.
Does the Plan identify the position, office, department, or agency responsible for implementing and administering the action/project, estimated cost, potential funding sources and expected timeframes for completion?
Does the LMS identify the local planning mechanisms where hazard mitigation information and/or actions may be incorporated?
Does the plan describe each community's process to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms?

The Columbia County Local Mitigation Strategy outlines the goals and objectives that will lead mitigation efforts in each participating jurisdiction (i.e. the City of Lake City, the Town of Ft. White, and Unincorporated Columbia County) over the next 5 years. The implementation plan to accomplish these initiatives is offered below, while specific measures for each jurisdiction are listed in Appendix B.

The following procedures in updating the Columbia County Mitigation Strategy include:

- Reevaluate and approve mitigation goals and objectives
- Review and examine the existing mitigation projects/initiatives and/or action items
- Identify new mitigation projects/initiatives and/or action items
- Prioritize all mitigation projects/initiatives and/or action items
- Determine all appropriate funding sources

Each of these components ensures that the County has an established mitigation strategy that helps reduce its vulnerability.

Columbia County LMS Mitigation Goals and Objectives

Columbia County's LMS Mitigation Goals and Objectives are intended to reduce or avoid the long-term vulnerability to the effects of the profiled hazards addressed in the risk assessment area in Section 4.

The mitigation goals are comprehensive long-term policy and vision statements that explain what is to be achieved putting the mitigation strategy into action.

In the planning process the Working Group establishes goals for the entire planning area and all of the participating jurisdictions. The current goals and objectives were reviewed and carefully evaluated. It was determined that they needed revisions and updates based on the following criteria:

- ✓ They reflect the updated risk assessment
- ✓ They were analyzed and re-evaluated which lead to the current mitigation projects that will reduce the vulnerability for each jurisdiction
- ✓ They did support to the changes made in the mitigation priority list, and
- ✓ They provided the direction needed to reflect the current State of Florida goals for mitigating hazards within the counties

The mitigation goals for 2020 address the vulnerability of the Columbia's citizens, the critical facilities, and the private and public buildings. Improving public awareness of hazard risk and mitigation and ensuring that the entire community has the knowledge on how to prepare for and respond to all hazard events. The goals and objectives were evaluated and updated.

Table 5.1 - Columbia County LMS Mitigation Goals & Objectives

Mitigation Goals	Objectives
All Hazards – Flooding, Hurricanes/ Tropical Storms, Wildfires, Sinkholes, Tornadoes, Thunderstorms, Strong Winds, Lightning, Hailstorms, Riverine Erosion, Drought, Extreme Heat, Winter Storms and Freezing Temperature	

Goal 1 **Protect human health, safety and welfare to natural hazards**	1.1 Protect all vulnerable populations. 1.2 Ensure the protection of critical facilities. 1.3 Maintain sufficient number of emergency shelters. 1.4 Continue on-going education and outreach programs for the County citizens on all natural hazard events to include: safety, prevention, preparedness, mitigation, recovery, and insurance. 1.5 Promote early warning systems to promote the safety of citizens through communication regarding all hazard events. 1.6 Work to provide continued training for government officials (through FEMA, ASFPM, etc.).
Goal 2 **Protect public and private property**	1.1 Utilize every opportunity to mitigate vulnerable structures. 1.2 Ensure public facilities and buildings are hardened to withstand natural hazards. 1.3 Evaluate current conditions of public building and facilities to withstand natural hazards. 1.4 Continue to enforce current building codes. 1.4 Maintain infrastructure at the City Municipal Airport. 1.5 Promote post-disaster mitigation as part of the recovery process.
Goal 3 **Minimize loss of public utilities**	1.1 Update and maintain current zoning regulations to minimize damage and utility service disruption. 1.2 Continually work with utility companies to maintain utility service minimizing down time. 1.3 Maintain level of utility service to public in City and Town limits.
Flooding	
Goal 4 **Minimize the effects of flooding in Columbia County**	1.1 Promote better floodplain management and risk awareness of flooding events. 1.2 Continue to evaluate and identify all flood areas throughout the County. 1.3 Maintain and update flood data and Flood Insurance Rate Maps (FIRM). 1.4 Ensure infrastructure can withstand and function effectively during flooding events. 1.5 Continue to enforce zoning regulations and flood ordinances with annual reviews and updates, if necessary. 1.6 Continue on-going education programs for the County citizens on flooding events. 1.7 Acquisition and or retrofit repetitive loss (RL) properties. 1.8 Perform additional flood studies in Zone A and AE areas to establish Base Flood Elevations (BFE). 1.9 Work to increase inspection of existing properties in AE flood zones for compliance with flood ordinance.

Wildfires	
Goal 5 **Minimize the effects of wildfires in Columbia County**	1.1 Support the Florida Forest Service with fuel reduction activities in the Wildland-Urban Interface. 1.2 Continue support on the Florida Forest Service programs in educating homeowners about wildfires and the need for vegetation management programs such as prescribed fire. 1.3 Coordinate with the Florida Forest Service to develop and retrofit strategies incorporating Firewise construction and landscaping techniques.

Summary Overview of the Goals and Policy Objectives

As Columbia County's LMS plan continues to evolve, the goals will be reviewed on an annual basis at an LMS meeting to ensure that they are applicable to meeting the unique needs of the community. The LMS Goals and Objectives were reviewed and updated with the Working Group at the December 17, 2019 meeting. The Working Group members concluded that the 2020 goals and objectives met the needs for the county and were incorporated in this LMS annual plan update.

Mitigation Initiatives

Existing Authorities, Policies, Programs & Resources
With regard to mitigation, these are the existing authorities, policies, programs and resources for Columbia County, City of Lake City and the Town of Ft. White.

Columbia County
Columbia County is governed by a County Commission, composed of elected officials from five districts who collaborate with the LMS Working Group. Columbia County Emergency Management Office is responsible for initiating all Working Group activities, maintaining the plan, and leading most mitigation project activities in coordination with the other local departments and agencies. The local government representatives are active in the mitigation efforts for the County.

Columbia Resources, Policies & Programs
The County's mitigation resources reside in several areas and the county continues to actively pursue mitigation grant funding and understands how to leverage multiple fund sources to achieve mitigation activities. Policies that would be considered as hazard mitigation exist within the land development regulations and the comprehensive plan.

Columbia County has an excellent mitigation grant program administered by the emergency management director. The most serious limitation facing the County with regard to mitigation efforts is the financial capacity to find matching funds for mitigation grant projects, and funding for additional staff to manage the complexities of the grants themselves. Columbia has a strong history of applying for and receiving mitigation grants and completing mitigation projects or initiatives.

Grants & Programs
Mitigation Grants for Residential and Commercial Properties
The County and City of Lake City continue to encourage and support grant applications for retrofitting existing structures by participating in all HMGP grant cycles and the annual federal grant programs such as the Flood Mitigation Assistance (FMA) Program and the Pre-Disaster Mitigation (PDM) Program.

FEMA's Hazard Mitigation Grant Program (HMGP)
The County applies for all available federal funding including post-disaster HMGP grants. The key purpose of the HMGP grant program is to enact mitigation measures that reduce the risk of loss of life and property from future disasters.

State Housing Initiatives Partnership (SHIP) Program
The Suwanee River Economic Council manages the SHIP program, which provides funds to local governments as an incentive to create partnerships that produce and preserve affordable homeownership and multifamily housing. The program was designed to serve low and moderate income families. Although the replacement of windows, doors, roofs and other housing elements are considered to be maintenance activities, because these items are installed or constructed in accordance with current building codes this results in homes that are stronger and more protected against potential damages from natural hazards. The county has been implementing this program since its inception in the early 1990's.

City of Lake City
The City of Lake City is the county seat and is governed by a City Council composed of four council members and a mayor. The City Manager is an active member of the LMS Working Group. The Building and Zoning Director implements all of the development and permitting activities for the City, including the enforcement of the City's flood damage prevention ordinance. A Public Works Director manages the local infrastructure such as roads and bridges, and emergency management services are handled through coordination between the City Manager's office and the Sheriff's Department.

Lake City Resources, Policies & Programs
The City of Lake City participates in regular mitigation programs with the County. Policies that would be considered as hazard mitigation exist within the land development and the comprehensive plan. The City does apply for grants for some mitigation projects, including road hardening, and infrastructure repair or maintenance. For private property mitigation, there is an overall lack of ability to meet any local cost shares for federal mitigation grants.

Town of Ft. White
The Town of Ft. White is governed by a Town Council composed of four council members and a mayor. It is a relatively small (2.4 square miles) rural town with an estimated 2019 population of 554 residents, a 2% decrease from the 2010 census count. Ft. White maintains and has an inter-local agreement with the county for the implementation of development and permitting in the town.

Ft. White Resources, Policies & Programs
The town has a small staff and limited financial resources and participates in regular mitigation programs with the County. Policies that would be considered as hazard mitigation exist within the land development codes.

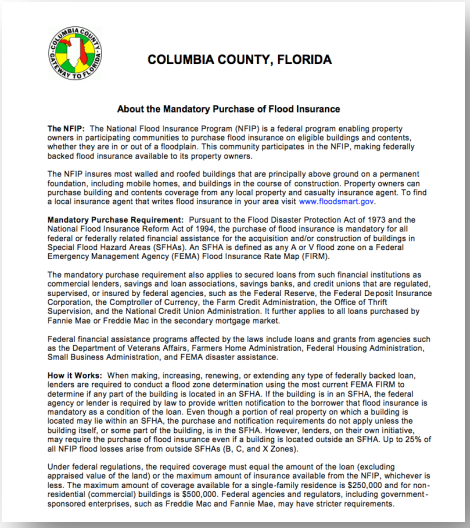
National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements

As stated by FEMA… "The NFIP is aimed at reducing the impact of flooding on private and public structures. This is achieved by providing affordable insurance for property owners and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. Overall, the program reduces the socio-economic impact of disasters by promoting the purchase and retention of Risk Insurance in general, and National Flood Insurance in particular."

Source: https://www.fema.gov/national-flood-insurance-program

Floodplain Management and the National Flood Insurance Program

Columbia County posts details on the mandatory purchase of flood insurance for the county residents.



COLUMBIA COUNTY, FLORIDA

About the Mandatory Purchase of Flood Insurance

The NFIP: The National Flood Insurance Program (NFIP) is a federal program enabling property owners in participating communities to purchase flood insurance on eligible buildings and contents, whether they are in or out of a floodplain. This community participates in the NFIP, making federally backed flood insurance available to its property owners.

The NFIP insures most walled and roofed buildings that are principally above ground on a permanent foundation, including mobile homes, and buildings in the course of construction. Property owners can purchase building and contents coverage from any local property and casualty insurance agent. To find a local insurance agent that writes flood insurance in your area visit www.floodsmart.gov.

Mandatory Purchase Requirement: Pursuant to the Flood Disaster Protection Act of 1973 and the National Flood Insurance Reform Act of 1994, the purchase of flood insurance is mandatory for all federal or federally related financial assistance for the acquisition and/or construction of buildings in Special Flood Hazard Areas (SFHAs). An SFHA is defined as any A or V flood zone on a Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM).

The mandatory purchase requirement also applies to secured loans from such financial institutions as commercial lenders, savings and loan associations, savings banks, and credit unions that are regulated, supervised, or insured by federal agencies, such as the Federal Reserve, the Federal Deposit Insurance Corporation, the Comptroller of Currency, the Farm Credit Administration, the Office of Thrift Supervision, and the National Credit Union Administration. It further applies to all loans purchased by Fannie Mae or Freddie Mac in the secondary mortgage market.

Federal financial assistance programs affected by the laws include loans and grants from agencies such as the Department of Veterans Affairs, Farmers Home Administration, Federal Housing Administration, Small Business Administration, and FEMA disaster assistance.

How it Works: When making, increasing, renewing, or extending any type of federally backed loan, lenders are required to conduct a flood zone determination using the most current FEMA FIRM to determine if any part of the building is located in an SFHA. If the building is in an SFHA, the federal agency or lender is required by law to provide written notification to the borrower that flood insurance is mandatory as a condition of the loan. Even though a portion of real property on which a building is located may lie within an SFHA, the purchase and notification requirements do not apply unless the building itself, or some part of the building, is in the SFHA. However, lenders, on their own initiative, may require the purchase of flood insurance even if a building is located outside an SFHA. Up to 25% of all NFIP flood losses arise from outside SFHAs (B, C, and X Zones).

Under federal regulations, the required coverage must equal the amount of the loan (excluding appraised value of the land) or the maximum amount of insurance available from the NFIP, whichever is less. The maximum amount of coverage available for a single-family residence is $250,000 and for non-residential (commercial) buildings is $500,000. Federal agencies and regulators, including government-sponsored enterprises, such as Freddie Mac and Fannie Mae, may have stricter requirements.

Floodplain management is the operation of a community program of corrective and preventative measures for reducing flood damage. These measures take a variety of forms and generally include requirements for zoning, subdivision or building, and special-purpose floodplain ordinances particularly with respect to new construction. Columbia County enforces local floodplain management ordinances that provide flood loss reduction building standards for new and existing development.

Compliance with NFIP

All jurisdictions within the County participate with NFIP. See table 5.2.

Table 5.2 - Columbia County Participation in the NFIP as of 3/9/2020

CID #	Community Name	County	Init FHBM Identified	Init FIRM Identified	Curr Eff Map Date	Reg- Emer Date	Tribal
120070B	Columbia County	Columbia County	1/20/1978	1/6/1988	11/2/2018	1/6/1988	No
120406B	City of Lake City	Columbia County	10/29/1976	1/6/1988	11/2/2018	1/6/1988	No
120349#	Town of Ft. White	Columbia County		2/4/2009	(NSFHA) *	9/30/2013	No

* NSFHA – No Special Flood Hazard Area – All Zone C

Table 5.3 - NFIP Insurance Report as of 9/30/2018

Community Name	Policies In-force	Insurance In-force whole $	Written Premium In-force
Columbia County	772	$163,756,200	492,636
City of Lake City	60	$16,610,000	81,484
Town of Ft. White	3	357,000	780
Total	**835**	**$180,723,200**	**574,900**

Repetitive Loss (RL) Property

As noted by FEMA… "A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period since 1978. The property may or may not be currently insured by the NFIP. Structures that flood frequently strain the National Flood Insurance Fund and these properties are the biggest draw on the Fund."

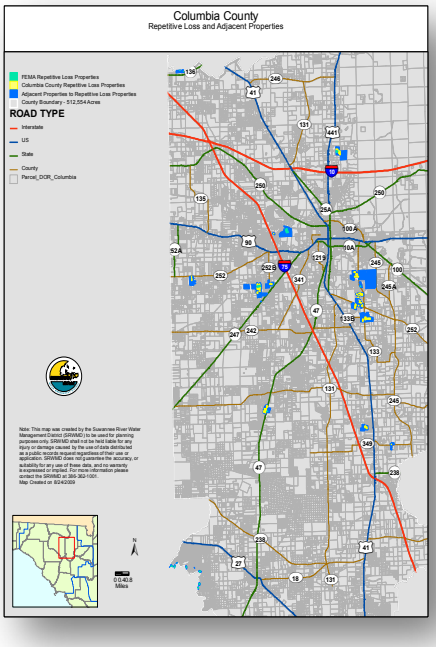
With the increase in NFIP's annual losses and the need for borrowing, the repetitive loss properties drain funds needed to prepare for catastrophic events. Community leaders and the county residents are also concerned with these properties because their lives are disrupted and may be threatened by the continual flooding. The primary objective of the RL properties strategy is to eliminate or reduce the damage to property and the disruption to life caused by repeated flooding of the same properties.

Columbia County and the SRWMD created a map of the repetitive loss and adjacent properties. The map was created on 8/24/2009 and is used for planning purposes.

Figure 5.1 - Repetitive Loss Map

The map legend notes the following:

- Green - FEMA Repetitive Loss Properties (consisting of single family dwellings, sfr piling, mobile homes, duplex and one office).
- Yellow – Columbia County Repetitive Loss Properties (consisting of single family dwellings, sfr piling, mobile homes, duplex, modular, vacant, and one service shop).
- Blue – Adjacent Properties to the Repetitive Loss Properties (consisting of single family dwellings, duplex, mobile home, multi-family residences, sfr piling, vacant, and one barn).



Source: SRWMD

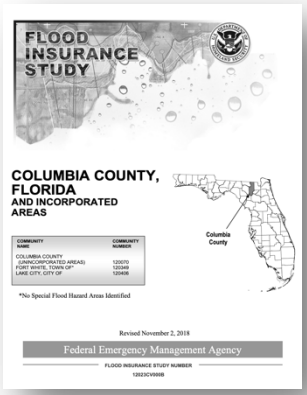
There are 110 repetitive loss properties in Columbia County.

Unincorporated Columbia County
- ✓ 105 residential RL properties
- ✓ 1 business RL property

City of Lake City
- ✓ 2 residential RL properties
- ✓ 2 business RL properties

Town of Ft. White - there were no RL identified in Ft. White

Columbia County NFIP Overview



As of 9/30/2018, see table 5.3 there are currently 835 flood insurance policies in force. Current flood maps were updated and adopted February 4, 2009 and selected areas were revised with an effective date on November 2, 2018. The detailed floodplain studies were performed in the Flood Insurance Study (FIS) by FEMA and SRWMD on Rose Creek, Cannon Creek, and Montgomery Outlet Stream, Santa Fe River and the Suwannee River to create profiles prior to our last map revision. These profiles can be found in FIS #12023CV000B dated November 2, 2018. Prior to that date Columbia County was using flood maps from February 4, 2009.

Columbia County's current floodplain ordinance was adopted on December 30, 2008 and can be found in Article 8, Floodplain Management of the Land Development Regulations. The ordinance was adopted to meet 44 Code of Federal Regulations Section 60.3(b) of the NFIP. The Columbia County Planner serves as the designated Floodplain Administrator (Article 8, Section 8.3.3) and is also currently the CRS Coordinator.

Additional Specifics on the Land Development Regulations

Article 4
- 4.2.27 - restricts placement of any structure no closer than 75' to the Ichetucknee River, Olustee Creek, Santa Fe River and Suwannee River. All other waterfront yards are restricted to 50' to the mean high water line or generally recognized riverbank.
- 4.2.38 - lists requirements for development in stream to sink and watershed areas.
- Article 4 of the Land Development Regulations also has Conservation (section 4.3), Environmentally Sensitive Areas (section 4.4), Agriculture 1, 2, and 3 (section 4.5) zoning districts wherein low density development is required. These zoning categories also have a special provision that prohibits development within 35' of any wetland.

Article 7
- The design and performance of stormwater management systems shall comply with applicable state and water management district regulations (chapter 62, rules of the Florida Department of Environmental Protection; and 40B-4 rules of the water management district, Florida Administrative Code, as amended). In all cases the strictest of the applicable standards shall apply.

Article 8

- 8.3.3 - The floodplain administrator, in coordination with other pertinent offices of the community, shall: 1.Review applications and plans to determine whether proposed new development will be located in flood hazard areas; 2.Review applications for modification of any existing development in flood hazard areas for compliance with the requirements of this ordinance; 3.Interpret flood hazard area boundaries where such interpretation is necessary to determine the exact location of boundaries; a person contesting the determination shall have the opportunity to appeal the interpretation; 4.Provide available flood elevation and flood hazard information; 5.Determine whether additional flood hazard data shall be obtained from other sources or shall be developed by an applicant; 6.Review applications to determine whether proposed development will be reasonably safe from flooding; 7.Issue floodplain development permits or approvals for development other than buildings and structures that are subject to the Florida Building Code, including buildings, structures and facilities exempt from the Florida Building Code, when compliance with this ordinance is demonstrated, or disapprove the same in the event of noncompliance; and 8.Coordinate with and provide comments to the Building Official to assure that applications, plan reviews, and inspections for buildings and structures in flood hazard areas comply with the applicable provisions of this ordinance.
- 8.4.1 the procedures and requirements for a development permit.
- 8.5.2 lists the specific standards that must be adhered to for development in all A zones where a Base Flood Elevation (BFE) has not been established.

Continued adherence to requirements set forth in Article 8 of Columbia County Land Development Regulations, Flood Prevention Damage Regulations. The Conservation Element of Columbia County Comprehensive Plan contains many objectives and policies that support floodplain management provisions. Policy V.2.3 requires the county to identify and purchase environmentally sensitive lands. Policy V.2.4 establishes the 35 ft. buffer around all wetlands. Policy V.2.6 requires the county's land development regulations to require all new development to maintain the natural functions of environmentally sensitive areas. Policy V.2.7 requires the county to provide for the regulation of development within 100-yr. floodplains, regulating freeboard requirements and density. Policy V.2.14 and V.2.15 establish 50 or 75 feet buffers from rivers, streams, creeks, etc. Policy V.3.2 requires all proposed subdivision plats be submitted to the SRWMD for review and comment.

The Columbia County Building Department currently requires all permit applications to be reviewed by the building official to ensure compliance with the Florida Building Code and to be reviewed by the zoning department to determine zoning and flood zone determinations. Both departments must approve all permit applications submitted before a permit can be issued. Any information dealing with flood zone Base Flood Elevation (BFE), Flood Insurance Rate Map (FIRM) panel # and date are shown on the permit as well as any other requirements such as finished floor elevation certificate.

Columbia County Emergency Management works closely with the Building and Zoning Department to map areas that are prone to frequent floods and track repetitive loss properties. After a disaster all damaged structures are inspected and the damage documented, repetitive loss properties are purchased utilizing grant money when funds are available.

The county library maintains a wealth of information for public access on education regarding flood issues to include retrofitting, safety, insurance, maps, historical data, and many other sources of information.

Columbia County Emergency Management monitors maps that are prone to frequent floods and track all repetitive loss properties. The County will continue to participate in the NFIP and follow actions that have been identified, analyzed, and prioritized as necessary steps to remain in compliance with the program. The County will continue to:

- ✓ Enforce the most current Florida Building Code, Land Development Regulations, Comprehensive Plan and all Codes of Ordinances;
- ✓ Provide outreach efforts to the public with extra emphasis to those properties lying in the repetitive flood areas;
- ✓ Furnish up-to-date FIRM information to all that seek information;

- ✓ Update the county website with information that will benefit the public and educate the builders, surveyors, and engineers that we work with;
- ✓ Monitor all elevation certificates and maintain records and copies for anyone to review;
- ✓ Assist local insurance agents with obtaining correct FIRM's and flood insurance rates;
- ✓ Participate in all hazard mitigation efforts to include working with Columbia County Emergency Management to maintain and monitor hazard data for future planning;
- ✓ Obtain grants to purchase repetitive loss properties;
- ✓ Submit all information to FEMA necessary to keep current FIRM's as accurate as possible;
- ✓ Participate whenever possible in any future flood studies; and
- ✓ Keep all necessary staff trained.

The Building and Zoning Department has reviewed the FEMA 85, Protecting Manufactured Homes from Floods and Other Hazards: The Building and Zoning Department will continue to evaluate if flood policies need to be updated to comply with the publication. If changes are made, the department will then begin the process of educating the local mobile home installers. The department has also reviewed 24 CFR Part 3286 Manufactured Home Installation Program that was published June 20, 2008. This publication from HUD sets prerequisites for installation licenses. We will coordinate this effort with the State of Florida Department of Business and Professional Regulation to determine what changes will be required.

To improve our level of participation, possible changes for the future may include expanding the Environmentally Sensitive Areas (ESA) zoning and land use classification to include properties that are in all A zones. Increase the freeboard requirement for development in Special Flood Hazard Area (SFHA)'s, prohibit development in any floodways, increase inspection efforts for non-compliance of existing properties in AE floodway areas, participate in new flood studies as funds permit, and obtain additional funding to acquire more repetitive loss properties. Columbia County will examine all CRS activities every 5 years during our CRS visit to determine if it is feasible to augment an existing activity or add additional activities.

City of Lake City NFIP

As noted in Table 5.2, the City of Lake City has been participating in the NFIP since January 6, 1988 with Community Identification Number: 120406B. As of September 30, 2018, the City has issued 60 flood insurance policies with repetitive loss properties located within the Lake City area.

The flood maps adopted on February 4, 2009 are reflected in City Ordinance #2009-1175. The Ordinance makes findings to reflect current State and Federal requirements specifically those promulgated in part 44, CFR. In addition, there are program administrative components found in Subdivision Regulations Article 5 and Planned Residential Developments (PRD) section.

The City of Lake City, Florida adopted and maintains a Comprehensive Plan which establishes Goals, Objectives, and Policies which establishes needs of the City to:

- ✓ Enhance quality of life by directing development to areas, which have levels of service to accommodate growth in environmentally acceptable standards;
- ✓ Provide for traffic circulation; and
- ✓ Supports safe, decent, and sanitary housing in suitable environments.

The City integrates flood plain management into the Comprehensive Plan throughout the following sections:

- ✓ Future Land Use (Policy I.4.1; Policy I.6.4; Objective I.10)
- ✓ Conservation Element (V.2.6; V.2.7; V.2.8; V.4.5)
- ✓ Capital Improvements Element (VIII.4.7)

Although the City does not participate in the CRS, they have adopted and implemented standards above and beyond the NFIP standards in an effort to further reduce or eliminate damage from flooding. Ord. 2009-1175, Sec. 50-67 requires 2‘ to bottom of floor joist where elevations for ―A‖ zones are not specified. Section 50-67 (4) (a) requires mobile homes outside of mobile home parks be elevated no lower than 2‘ above base flood elevation.

The City is ensuring the provisions of public drainage facilities for Future Developments by:

- ✓ Standards to ensure post run-off rates do not exceed re-development rates;
- ✓ Provide guidance to developers of storm design requirements;
- ✓ Maintain standards as adopted by Florida Department of Environmental Protection and Rules of the SRWMD;
- ✓ Ensure provisions for safe and reliable potable water system and Fire Hazard reduction capabilities;
- ✓ Provide for conservation element that establishes policies, which conserve wetlands by use of alternative clustering development and the setting of density performance standards;
- ✓ Requiring the City to participate in the NFIP;
- ✓ Establish 35‘ buffers around wetlands;
- ✓ Where appropriate, City shall purchase environmentally sensitive lands (Policy V.2.3); and
- ✓ Establishes an Intergovernmental Coordination Element.

The City‘s Land Development Administrator is designated as the Floodplain Administrator. In addition to information available within the public library the City‘s Growth Management Department maintains information and guides to development in SFHA‘s.

The City of Lake City will continue to participate in the NFIP. The following actions have been identified, analyzed, and prioritized as necessary steps to remain in compliance with the program. The City will continue to:

- ✓ Emphasize the establishment of on-going drainage maintenance programs to support timely maintenance and repairs of ditches and culverts to minimize effects of flood events;
- ✓ Maintain and promote training for Planners/Plan Reviewers for certification as Floodplain Managers;
- ✓ Prioritize overlay maps of SFHA‘s to identify additional flood prone areas not identified on adopted FIRM‘s;
- ✓ Identify flood prone areas not on FIRM‘s and apply for assistance grants to include areas on maps (located in the northeast section of city);
- ✓ Provide information to assist homeowner and developer guidance and measures to reduce damage related to the hazards identified in the LMS; and
- ✓ Apply through grant process measures to improve or construct shelters in the event of future hazards.

Town of Ft. White

As stated in Table 5.2, the Town of Ft. White has been participating in the NFIP since February 4, 2009 with Community Identification Number: 120349#. As of September 30, 2018, the Town has issued 3 flood insurance policies.

The town integrates flood plain management into the Land Development Code throughout the following sections:

- ✓ Floodplain Management – Sections 5.05; 5.05.02 and 5.05.03

Community Rating System (CRS)

The Community Rating System (CRS) is a voluntary program for National Flood Insurance Program (NFIP) participating communities. This program’s goals are to reduce flood damages to insurable property, strengthen and support the

insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. CRS has been developed to provide incentives in the form of premium discounts for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding.

Per FEMA's April 2019 NFIP Flood Insurance Manual, 5/1/2019, the only jurisdiction in the County that participates in the CRS is: Unincorporated Columbia County. See table 5.4.

Table 5.4– Columbia County Community Rating System – 5/1/2019

Community Number	Community Name	CRS Entry Date	Current Effective Date	Current Class	% Discount for SFHA	% Discount for Non-SFHA	Status
120070	Columbia County	10/1/1996	10/1/2005	8	10	5	C

Columbia County does participate in the CRS and currently has a rating of 8. This represents a 10% savings on flood insurance rates for the community. The County currently implements and gets credit for the following CRS activities:

- ✓ Activity 310 - Elevation Certificates – copies of elevation certificates for properties built in the SFHA from June 2004 and on are kept for the public to review
- ✓ Activity 320 - Map Information – notification to three key groups, (lending, insurance, realtors) of map change effective February 4, 2009, sources of additional information and process for review of determinations.
- ✓ Activity 330 - Outreach Projects – there is a flood information booklet sent to all properties determined to be located in repetitive flood areas.
- ✓ Activity 350 - Flood Protection Information – a website was created for public use.
- ✓ Activity 410 - Additional Flood Data – flood studies done on additional areas of Alligator Lake, Lake Montgomery, Montgomery Outlet Stream, the Suwannee River, the Santa Fe River, the Cannon Creek, and the Rose Creek with profiles created for FIRM adopted February 4, 2009. Updated analyses were included for the flooding sources on Clay Hole Creek, Deep Creek, Falling Creek and Falling Creek Tributary, Gwen Lake, Lake Desoto, Lake Harper, Lake Jeffery, Robinson Creek, Unnamed Tributary to Falling Creek Tributary and Watertown Lake, November 2, 2018.
- ✓ Activity 420 - Open Space Preservation – aerial maps created depicting areas of open space within SFHA and acres of land designated as open space.
- ✓ Activity 430 - 0LD Land Development Criteria – aerial map created depicting low density, open space and special flood hazard areas.
- ✓ Activity 440 - Flood Data Maintenance – there is maintenance of flood maps to show and revisions (Letter of Map Amendment (LOMA), Letter of Map Revision (LOMR), etc.).
- ✓ Activity 450 - Storm Water Management – inspection for compliance to all permits issued by Suwannee River Water Management District (SRWMD).
- ✓ Activity 502 - Repetitive Losses – map created to determine repetitive loss areas and properties. Outreach project sent to all properties located in potential repetitive loss area.
- ✓ Activity 510 - Floodplain Management Planning – Update of the LMS plan.

Identification and Analysis of Columbia County's Mitigation Projects or Initiatives

The Local Mitigation Strategy consists of actions designed to minimize potential losses to natural disasters identified in the risk assessment. The strategy provides for maintaining existing protection mechanisms provided in the County and municipal government comprehensive plans, land development regulations and other implementation mechanisms. The strategy also provides for identifying future local government capital improvements, which, among other purposes, mitigate adverse impacts from natural disasters, and a public information program to educate County residents of the need to prevent and mitigate damage caused by natural disasters.

In the last LMS Plan update, it was recommended that it would better serve the local communities to include references of the LMS hazard maps in the comprehensive plans. However, due to the fluctuation in hazards and the areas affected was too great to be sufficiently effective over the seven year comprehensive planning timeframe and decided not to include the maps but instead where possible, refer to the LMS.

As part of its strategy, the County will maintain its NFIP and the CRS certificate. The County and its associated municipalities will also use any updated floodplain maps prepared as a result of the FEMA Floodplain Map Modernization Program and Repetitive Loss Initiative. When feasible, all products produced through the FEMA's on-going field and database verification projects for repetitive loss properties will be utilized.

The risk assessment identifies Columbia County is most susceptible to floods, wildfires, severe thunderstorm/wind, hail, tornadoes, lightning, and hurricane/tropical storm events. The County and its associated municipalities evaluate their comprehensive plans and land development regulations for modifications to improve mitigation measures, with special emphasis on these occurrences. Through the years, Columbia County will continue to improve its recordkeeping and statistical data with regards to natural disasters for the annual vulnerability assessment. Emergency Management will continue to file and document "impact" details with photos on specific hazard events, which will enhance the LMS plan with a more accurate vulnerability analysis.

The County maintains a list of repetitive loss structures and properties and adjacent properties. The County with the assistance of other related agencies (Florida Department of Transportation (FDOT), SRWMD, and the Florida Forest Service) implements a public education campaign regarding construction within floodable areas, emergency water conservation regulations, as well as minimum housing codes with regards to minimum building standards, the use of Firewise construction and landscaping practices, and burn bans.

Columbia County Local Mitigation Strategy Projects or Initiatives

Appendix B, contains three separate mitigation project lists (ongoing, completed and deleted). The mitigation projects or initiatives are action items for the identified hazards in Section 4 and addresses the reduction of hazards **on new as well as existing buildings and infrastructure**. It will describe the mitigation project, identify if the hazard has been mitigated, if the goals were achieved through the completion of the project, the funding source, the agency responsible for implementation, the estimated cost or total final costs, the timeframe for completion, and details on the progress of the mitigation project.

They are as follows:

- ✓ the *new, ongoing, and deferred* mitigation projects - (the deferred projects remain active and will be pursued as funding sources are identified or priorities change due to disaster events),
- ✓ the mitigation projects that have been *completed* over the last five years, and
- ✓ the mitigation projects that have been removed or deleted.

Analysis of the Comprehensive Range of Projects

Table 5.5 determines that Columbia County has a "comprehensive range" of specific mitigation projects that will address the goals to reduce or avoid long-term vulnerability for each jurisdiction and was prepared after analyzing the new, ongoing and deferred mitigation project list.

Table 5.5 – Comprehensive Range of Mitigation Projects

Comprehensive Range of Mitigation Projects - Columbia County			
Natural Hazards Profiled	**Unincorporated Columbia County**	**City of Lake City**	**Town of Ft. White**
Flooding	x	x	x
Sinkhole	x	x	x
Hurricanes/ Tropical Storms	x	x	x
Tornado	x	x	x
Thunderstorms/Winds/Lightning/Hailstorms	x	x	x
Erosion/Riverine Erosion	x	x	x
Wildfire	x	x	x
Drought/Heat Wave	x	x	x
All Hazards	x	x	x
All requirements are met	x	x	x

Appendix B outlines the current mitigation projects or initiatives for each jurisdiction within the county including specifics on the natural hazards that will be mitigated, the agency responsible of overseeing the project, analysis of the initiative and potential funding source, and what jurisdiction will benefit from the mitigation project.

Implementation of the Mitigation Projects

All mitigation projects or initiatives were reviewed, analyzed, and revised according to the list of mitigation projects that were developed and updated in the 2020 LMS Plan. Appendix B contains the list of all mitigation projects for the identified hazards.

As established, the LMS project list includes actions that address the reduction of hazards on new as well as existing buildings and infrastructure, and the mitigation project status over the last 5 years. Details on the project included: if the mitigation project was completed, deferred, deleted or any new projects that have been included as a result of a hazard event.

Prioritization Process and Benefit-Cost Review

In developing the prioritization procedures, it is not the intent to direct that the projects be accomplished in their prioritized order. The purpose of the ranking is to indicate the overall importance of the project to the local mitigation efforts. The accomplishment of an initiative or project will usually depend more on the availability of funds, than on how high or low it ranked compared to other initiatives.

The prioritization process requires the identification of projects and programs that appear to have a reduction in property

damage, have technical merit, be cost-effective, and will protect the health, safety and welfare of Columbia County's citizens and meet the other mitigation benefits noted above.

The main emphasis in the prioritization process and selection of the mitigation projects is to promote the projects or initiatives with the greatest mitigation benefits.

The benefits analyzed are the following:

- support public health, safety and welfare of Columbia County's citizens;
- protect lives and property;
- reduce future damage;
- maintain essential services;
- support LMS goals and objectives;
- ensure regional benefits;
- providing cost effectiveness; and
- protect natural and cultural resources.

Although the prioritization process includes economic considerations, the project projects will be analyzed for benefit cost based on the guidelines set forth by the state and FEMA.

The method of initiating a detailed and formal Benefit-Cost Analysis (BCA) can be a very time-consuming and tedious process and require professional expertise. The Columbia County LMS Working Group discussed the BCA process and determined for this 2020 LMS plan that it wasn't feasible to do a formal and extensive analysis on all of the current mitigation projects at this time. However, if future mitigation projects are being considered for funding, that a formal BCA will be performed utilizing the required expertise to execute the required benefit-cost ratio.

The BCA will be calculated on top tiered projects and/or projects which are included in any applications for funding to ensure that the projects are cost effective. Each action is scored individually and is based on five weighted criteria developed by the LMS Working Group. The process to prioritize the mitigation actions is accomplished during meetings between LMS Working Group members and officials from the respective local governments. Using the same criteria, the City of Lake City prioritizes their own projects before submitting them to the LMS Working Group for review.

Instead of the detailed BCA, the LMS Working Group developed an initial list of mitigation projects or initiatives and a priority score. Each mitigation project or initiative identified for funding will be cost- effective, technically feasible, contribute to the overall strategy outlined in the Local Mitigation Strategy, and be acceptable to regulatory agencies. The prioritization process for the mitigation projects was accomplished by the County LMS Working Group and officials from the respective local governments.

After the projects have been determined for each jurisdiction, they are assigned a priority score. This score is a long-term characterization value directly associated with each specific initiative based on its own merits at the time it was first proposed by the individual participant. The priority is intended to serve as a guideline for the Working Group regarding the relative desirability of implementation of a specific mitigation initiative in relation to the other proposed initiatives incorporated into the plan.

The scoring is based on selected criterion, including an estimated number of people who will benefit and the cost to implement each initiative. These scores are assigned according to the knowledge and discretion of the Working Group and are not considered exact technical estimates. The mitigation projects scoring with higher point totals have first priority. However, it would be a mistake to assume that only top priority initiatives should be considered for funding, as the priority projects often require significant resources and/or money. In a post-disaster situation, for example after a

significant hurricane event, the amount of money available for hazard mitigation projects could be as little as $30,000 or as much as $1 million or more. Therefore, it is important to have initiatives or projects with a range of costs that are rationally prioritized so that the jurisdictions can get the most value for the mitigation money they receive. Furthermore, simply because a mitigation initiative has high associated costs does not mean it is not cost effective.

A mitigation initiative or project may yield significant benefits over the lifetime of the project that far outweighs the initial costs. In lieu of conducting formalized benefit-cost analyses, order of magnitude cost estimates were made by the Columbia County Working Group assuming that less expensive projects would be easier to obtain funding for and could be implemented more readily.

The mitigation initiatives were assigned priority scores based upon the following criteria according to the Columbia County's Goals and Objectives for local mitigation and the program funding requirements of FEMA. The projects are then prioritized utilizing the prioritization criteria outlined below. The LMS Working Group may evaluate these criteria annually, recommending changes to prioritization criteria that are deemed necessary.

The mitigation project criteria includes:

- ✓ Does it accomplish one, more than one, or all of the LMS goals (*there are 5 mitigation goals*)?
- ✓ Does it promote the reduction of the loss of lives?
- ✓ Does it promote the reduction in property damage?
- ✓ Is the project required by regulation or is there an additional benefit to be provided by sponsoring agency (federal, state, or local programs?
- ✓ Is there funding already available?

The point awarding system for establishing a priority score for each mitigation project is outlined in Table 5.6. The maximum priority score for the project is 100.

Table 5.6 –Point System for the LMS Mitigation Projects

Prioritization Criteria	Weighted Values	
1. Does it accomplish one, more than one, or all of the LMS goals?	5 points for each goal accomplished	With no more than 25 points assigned
2. Does it promote the reduction of the loss of lives?	Yes = 25 points	No = 0 points
3. Does it promote the reduction in property damage?	Yes = 20 points	No = 0 points
4. Is the project required by regulation or is there an additional benefit to be provided by sponsoring agency (federal, state, or local programs?	Yes = 10 points	No = 0 points
5. Is there funding already available?	Funding source already identified	10 points
	Strong potential funding source	7 points
	No funding source identified	0 points

	If multiple funding sources are identified	3 additional points
	Possible Total Points	**100 points**

After a natural disaster event receives a presidential declaration and Columbia County was designated as a result of the disaster; the county will be eligible for the Hazard Mitigation Grant Program (HMGP) funding. Once the county receives the disaster designation the LMS committee or workgroup will meet to analyze the damage that was sustained. Then in respect to the current conditions in the County, changes in policy and overall mitigation needs, prioritization of projects to be funded will be reviewed for the specific declared disaster.

Potential Funding Sources for the Mitigation Projects

Mitigation projects implemented by the County and municipalities will be dependent on available funding. It is anticipated that the County and municipalities will seek federal, state, and local funds to assist in the implementation of action items involving capital improvements and/or additional personnel. In addition to local and county matching funds, there are numerous funding sources available to counties of all sizes. Table 5.7 is a current list of possible funding sources that can be used for the mitigation projects.

Table 5.7 – Possible Funding Sources

Clean Water State Revolving Funds (CWSRF)	The Clean Water State Revolving Fund (CWSRF) program is a federal-state partnership that provides communities a permanent, independent source of low-cost financing for a wide range of water quality infrastructure projects.
Community Assistance Program State Support Services Element (CAP-SSSE)	The Community Assistance Program – State Support Services Element (CAP-SSSE) program derives its authority from the National Flood Insurance Act of 1968, as amended, the Flood Disaster Protection Act of 1973 and from 44 CFR Parts 59 and 60. This program provides funding to states to provide technical assistance to communities in the National Flood Insurance Program (NFIP) and to evaluate community performance in implementing NFIP floodplain management activities. In this way, CAP-SSSE helps to: Ensure that the flood loss reduction goals of the NFIP are met, Build state and community floodplain management expertise and capability and Leverage state knowledge and expertise in working with their communities.
Community Development Block Grant (CDBG)	The Community Development Block Grants (CDBG) provide for long-term needs, such as acquisition, rehabilitation, or reconstruction of damaged properties and facilities and redevelopment of disaster-effected areas. Funds may also be used for emergency response activities, such as debris clearance and demolition, and extraordinary increases in the level of necessary public services. Eligible projects can include; • Voluntary acquisition, or if appropriate, elevation of storm damaged structures; • Relocation payments for displaced people and businesses; • Rehabilitation or reconstruction of residential and commercial buildings; • Assistance to help people buy homes, including down payment assistance and interest rate subsidies; and • Improvements to public sewer and water facilities.

Conservation Reserve Program (CRP)	CRP is a land conservation program administered by Farm Service Agency. In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. Contracts for land enrolled in CRP are 10-15 years in length. The long-term goal of the program is to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat.
County Incentive Grant Program	This program provides grants to counties, to improve a transportation facility which is located on the State Highway System or which relieves traffic congestion on the State Highway System. To be eligible for consideration, projects must be consistent, to the maximum extent feasible, with local metropolitan planning organization plans and local government comprehensive plans.
Economic Adjustment Assistance (EAA) Program	The EAA program provides a wide range of technical, planning, and public works and infrastructure assistance in regions experiencing adverse economic changes that may occur suddenly or over time. These adverse economic impacts may result from a steep decline in manufacturing employment following a plant closure, changing trade patterns, catastrophic natural disaster, a military base closure, or environmental changes and regulations.
Emergency Conservation Program (ECP)	The Emergency Conservation Program (ECP) helps farmers and ranchers to repair damage to farmlands caused by natural disasters and to help put in place methods for water conservation during severe drought. The ECP does this by giving ranchers and farmers funding and assistance to repair the damaged farmland or to install methods for water conservation.
Emergency Management Performance Grant (EMPG)	The purpose of the EMPG Program is to provide federal grants to states to assist state, local, territorial, and tribal governments in preparing for all hazards, as authorized by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (42 U.S.C. §§ 5121 et seq.) and Section 662 of the Post Katrina Emergency Management Reform Act of 2006, as amended (6 U.S.C. § 762). Title VI of the Stafford Act authorizes FEMA to make grants for the purpose of providing a system of emergency preparedness for the protection of life and property in the United States from hazards and to vest responsibility for emergency preparedness jointly in the federal government and the states and their political subdivisions. The Federal Government, through the EMPG Program, provides necessary direction, coordination, and guidance, and provides necessary assistance, as authorized in this title, to support a comprehensive all hazards emergency preparedness system.

Emergency Management Preparedness and Assistance Trust Fund/ Municipal Competitive Grant Program	The Emergency Management Competitive Grant Program and Municipal Competitive Grant Program provide competitive grants to state or regional agencies, local governments, and private non-profit organizations to implement projects that will further state and local emergency management objectives. The Municipal Competitive Grant Program provides competitive grants to municipalities that are legally constituted, have an authorized, established, and maintained emergency management program, and have signed the Statewide Mutual Aid Agreement (SMAA). Applications are accepted in the following four categories under both programs: • Projects that will promote public education on disaster preparedness and recovery issues. • Projects that will enhance coordination of relief efforts of statewide private sector organizations, including public-private business partnership efforts. • Projects that will improve the training and operations capabilities of agencies assigned lead or support responsibilities in the State Comprehensive Emergency Management Plan. • Other projects that will further state and local emergency management objectives which have been designated by the State of Florida as priorities in the applicable Notice of Fund Availability.
Environmental Education (EE) Grant	The purpose of the Environmental Education Grant (EEG) is to provide financial support for projects, which design, demonstrate or disseminate environmental education projects, methods, or techniques. Projects must focus on one of the following: (1) improving environmental education teaching skills; (2) education teachers, students, or the public about human health problems; (3) building State, local, or Tribal government capacity to develop environmental education programs; (4) educating communities through community-based organizations; or (5) educating general public through print, broadcast, or other media.
Federal Highway Administration, Planning & Environment, Intermodal and Statewide Programs	The intent of the Federal Highway Administration (FHWA) Intermodal and Statewide Programs is the expeditious development and management of high-quality feasibility studies with FHA funds. Within the context of Title 23 U.S.C. or in 23 CFR guidelines, the meaning of feasibility has the following parts: • The degree to which given alternative modes, management strategy, design or location is economically justified. • The degree to which such an alternative is considered preferable from an environmental or social perspective. • The degree to which eventual construction and operation of such an alternative can be financed and managed.
Florida Forever	Florida Forever is Florida's premier conservation and recreation lands acquisition program, a blueprint for conserving natural resources and renewing Florida's commitment to conserve the state's natural and cultural heritage.

Fire Prevention and Safety Grants (FP&S)	The Fire Prevention and Safety Grants (FP&S) are part of the Assistance to Firefighters Grants (AFG), and are administered by the Federal Emergency Management Agency (FEMA). FP&S Grants support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and reduce injury and prevent death. Eligibility includes fire departments, national, regional, state, and local organizations, Native American tribal organizations, and/or community organizations recognized for their experience and expertise in fire prevention and safety programs and activities. Private non-profit and public organizations are also eligible.
Flood Control Projects	Through the U.S. Army Corps of Engineers, the flood control program helps reduce flood damages through projects not specifically authorized by Congress.
Flood Mitigation Assistance Program (FMA)	The Flood Mitigation Assistance program (FMA) helps States and communities identify and implement measures to reduce or eliminate the long-term risk of flood damage to homes and other structures insurable under the National Flood Insurance Program (NFIP). Projects may include: • elevation, relocation, or demolition of insured structures; • acquisition of insured structures and property; • dry flood proofing of insured structures; • minor, localized structural projects that are not fundable by State • or other Federal programs (e.g., erosion-control and drainage improvements); • beach nourishment activities such as planting of dune grass; and • State agencies, participating NFIP communities, or qualified local organizations.
Flood Plain Management Services	Through the U.S. Army Corps of Engineers, to promote appropriate recognition of flood hazards in land and water use planning and development through the provision of flood and flood plain related data, technical services, and guidance.
Florida Communities Trust (FCT)	Florida Communities Trust assists communities in protecting important natural resources, providing recreational opportunities and preserving Florida's traditional working waterfronts through the competitive criteria in the Parks and Open Space Florida Forever Grant Program and the Stan Mayfield Working Waterfronts Florida Forever Grant Program. These local land acquisition grant programs provide funding to local governments and eligible non-profit organizations to acquire land for parks, open space, greenways and projects supporting Florida's seafood harvesting and aquaculture industries.
Florida Hurricane Catastrophe Fund (FHCF)	The FHCF is a State of Florida reinsurance program that can reduce the long-term economic impacts of hurricanes by maintaining the states property insurance capacity through providing reimbursement to participating insurers for a portion of catastrophic hurricane losses Insurers that write residential property insurance on structures and their contents are required to participate and pay a premium based on their maximum hurricane exposure. Companies can select three coverage option levels - 45, 75, or

	90% of covered losses above their retention. Premiums paid by participating insurers into the fund may be included in policyholder rates the same as the expense of reinsurance. Companies must demonstrate to the Office of Insurance Regulation that there is no overlap between the FHCF premium included in their rate filing and their Acat load, covering either private reinsurance or catastrophe reserves being set aside on a taxable basis.
Hazard Mitigation Grant Program (HMGP)	The HMGP program helps States and communities implement long-term hazard mitigation measures following a major disaster declaration. The program's objectives are to prevent or reduce the loss of life and property from natural hazards, to implement State or local Mitigation Strategies, to enable mitigation measures to be implemented during immediate recovery from a disaster, and to provide funding for previously identified mitigation measures that benefit the disaster area.
Land and Water Conservation Fund (LWCF) Grants	The LWCF State Assistance Program was established by the LWCF Act of 1965 (Section 6, Land and Water Conservation Fund Act of 1965, as amended; Public Law 88-578; 16 U.S.C. 4601-4 et seq.) to stimulate a nationwide action program to assist in preserving, developing, and assuring to all citizens of the United States of present and future generations such quality and quantity of outdoor recreation resources as may be available and are necessary and desirable for individual active participation. The program provides matching grants to States and through States to local units of government, for the acquisition and development of public outdoor recreation sites and facilities. Grant funds are also available, to States only, for fulfilling the statewide comprehensive outdoor recreation planning requirements of the program.
National Hurricane Program (NHP)	The National Hurricane Program (NHP) conducts assessments and provides tools and technical assistance to State and local agencies in developing hurricane evacuation plans. The program is a multi-agency partnership, involving the Federal Emergency Management Agency, the National Oceanic & Atmospheric Association, the National Weather Service, the U.S. Department of Transportation, the U.S. Army Corps of Engineers, and numerous other Federal agencies. NHP receives $5.86 million in annual funding, which consists of $2.91 million for FEMA program activities and $2.95 million for the Emergency Management Performance Grant program, which is directed into general State funds for hurricane preparedness and mitigation activities.
Nonpoint Source Implementation Grants	The 319 Program provides formula grants to the States to implement Nonpoint source projects and programs in accordance with Section 319 of the Clean Water Act. Examples of previously-funded projects include best management practices (BMPs) installation for animal waste; design and implementation of BMP systems for stream, lake, and estuary watersheds; basin-wide landowner education program; and lake projects previously funded under the CWA Section 314 Clean Lakes Program. Funding priority is to promote the development and implementation of watershed-based plans, focusing on watersheds with water quality impairments caused by nonpoint sources, which result in improved water quality in impaired waters.
Pollution Prevention Grants Program, Environmental	This grant program provides project grants to states to implement pollution prevention projects. The grant program is focused on institutionalizing multimedia pollution (air, water, land) prevention as an environmental management priority,

Protection Agency (EPA)	establishing prevention goals, providing direct technical assistance to businesses, conducting outreach, and collecting and analyzing data.
Pre-Disaster Mitigation Assistance Program (PDM)	The Pre-Disaster Mitigation (PDM) program provides funds for hazard mitigation planning and projects on an annual basis. The PDM program was put in place to reduce overall risk to people and structures, while at the same time, also reducing reliance on federal funding if an actual disaster were to occur.
Protection of Highways, Bridges, and Public Works	Through the U.S. Army Corps of Engineers, to provide protection of highways, highway bridges, essential public works, churches, hospitals, schools, and other nonprofit public services endangered by flood caused erosion.
Public Assistance (PA)	The mission of the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) Grant Program is to provide assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President. Through the PA Program, FEMA provides supplemental Federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain Private Non-Profit (PNP) organizations. The PA Program also encourages protection of these damaged facilities from future events by providing assistance for hazard mitigation measures during the recovery process.
Public Works Impact Projects Program (PWIP)	To provide financial assistance in the construction of public facilities for the purpose of providing immediate useful work to unemployed and underemployed persons in the designated project areas.
Repetitive Flood Claims (RFC) Program	The Repetitive Flood Claims (RFC) grant program provides funding to reduce or eliminate the long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP) that have had one or more claim payments for flood damages. The long-term goal of RFC is to reduce or eliminate claims under the NFIP through mitigation activities that are in the best interest of the National Flood Insurance Fund (NFIF). RFC funds may only mitigate structures that are located within a State or community that cannot meet the cost share or management capacity requirements of the Flood Mitigation Assistance (FMA) program.
Residential Construction Mitigation Program (RCMP)	The Residential Construction Mitigation Program (RCMP) is allocated $7,000,000 a year. The Mobile Home Tie-Down Program is provided 40% of this funding and 10% is provided to Florida International University for Hurricane Research. The remaining $3,500,000 is provided to eligible subgrantees for the performance of allowable activities. All projects are reviewed for eligibility and must meet cost-effectiveness requirements.

Self-Determination Act – Title III – County Funds	The Self-Determination Act (SRS Act) has recently been reauthorized and now includes specific language regarding the Firewise Communities program. Counties seeking funding under Title III must use the funds to perform work under the Firewise Communities program. Counties applying for Title III funds to implement, Firewise activities can assist in all aspects of a community's recognition process, including conducting or assisting with community assessments, helping the community create an action plan, assisting with an annual Firewise Day, assisting with local wildfire mitigation projects, and communicating with the state liaison and the national program to ensure a smooth application process. Counties that previously used Title III funds for other wildfire preparation activities such as the Fire Safe Councils or similar would be able to carry out many of the same activities as they had before.
Severe Repetitive Loss Program (SRL)	The Severe Repetitive Loss (SRL) grant program was designed to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the NFIP. SRL Properties are residential properties: • That have at least four NFIP claim payments over $5,000 each, when at least two such claims have occurred within any ten-year period, and the cumulative amount of such claims payments exceeds $20,000; or • For which at least two separate claims payments have been made with the cumulative amount of the building portion of such claims exceeding the value of the property, when two such claims have occurred within any ten-year period. Residential projects include: • Acquisition and demolition or relocation • Elevation and retrofit • Mitigation reconstruction • Dry flood-proofing of historical structures • Minor physical flood control projects The Federal/Non-Federal cost share is 75/25 % with up to 90% Federal cost-share funding for projects approved in states, territories, and federally-recognized Indian tribes with FEMA-approved Standard or Enhanced Mitigation Plans or Indian tribal plans that include a strategy for mitigating existing and future SRL properties. Florida is an Enhanced Plan state and so receives 90% Federal cost-share.
Small County Road Assistance Program (SCRAP)	The purpose of this program is to assist small county governments in resurfacing and reconstructing county roads. In determining a county's eligibility for assistance under this program, the department may consider whether the county has attempted to keep county roads in satisfactory condition, including the amount of local option fuel tax imposed by the county. The department may also consider the extent to which the county has offered to provide a match of local funds with state funds provided under the program.
Small County Outreach	The purpose of this program is to assist small county governments in repairing or

Program (SCOP)	rehabilitating county bridges, paving unpaved roads, addressing road-related drainage improvements, resurfacing or reconstructing county roads, constructing capacity or safety improvements to county roads. Small counties shall be eligible to compete for funds that have been designated for the Small County Outreach Program for projects on county roads. The Department shall fund 75% of the cost of projects on county roads funded under the program. Any initial bid costs or project overruns after the letting that exceed the Department's participation as stated, will be at the county's expense. This will help ensure that the funds are utilized on as many projects as possible. The county must have a population of 150,000 or less as determined by the most recent official estimate pursuant to Section 186.901, Florida Statutes. The county has attempted to keep county roads in satisfactory condition, which may be evidenced through an established pavement management plan. The county must provide 25% of the project costs and may be in the form of matching local funds (i.e., in-kind services). Such matching funds will be deducted from the project costs as part of the county's contribution.
Special Economic Development and Adjustment Assistance Program-Sudden and Severe Economic Dislocation (SSED) and Long Term Economic Deterioration (LTED)	The Economic Adjustment Program Grants assist State and local areas in the development and/or implementation of strategies designed to address structural economic adjustment problems resulting from sudden and severe economic dislocation (SSED) such as plant closings, military base closures and defense contract cutbacks, and natural disasters, or from long-term economic deterioration (LTED) in the area's economy. Grants may be made to develop an Economic Adjustment Strategy Grant, or to implement such strategies. Implementation grants may be made for the construction of public facilities, business development and financing (including revolving loan funds), technical assistance, training or any other activity that addresses the economic adjustment problem.
State Homeland Security Program (SHSP)	SHSP supports the implementation of state Homeland Security Strategies to address the identified planning, organization, equipment, training, and exercise needs to prevent, protect against, mitigate, respond to, and recover from acts of terrorism and other catastrophic events. SHSP also provides funding to implement initiatives in the State Preparedness Report. The State Administrative Agency (SAA) is the only entity eligible to apply to FEMA for SHSP funds. The allocation methodology for FY 2012 SHSP is based on three factors: minimum amounts as legislatively mandated, DHS' risk methodology, and anticipated effectiveness based on the strength of the Investment Justification (IJ). Each State and territory will receive a minimum allocation under SHSP using the thresholds established in the 9/11 Act. All 50 States, the District of Columbia, and Puerto Rico will receive 0.35 percent of the total funds allocated for grants under Section 2003 and Section 2004 of the Homeland Security Act of 2002, as amended by the 9/11 Act, for SHSP.
Transportation Equity Act for the 21st Century, Surface Transportation Program (STP)	The Surface Transportation Program (STP) funds may be used by State and local governments for any roads (including the National Highway System) that are not functionally classified as local or rural minor collectors. Each State sets aside 10% of STP funds for transportation enhancements, which can include water-related projects, such as wetland mitigation and implementation of control technologies to prevent polluted highway runoff from reaching surface water bodies. Other transportation enhancements include landscaping and other scenic beautification, pedestrian and bicycle trails, archaeological planning and research, preservation of abandoned railway

	corridors, historic preservation, sidewalk modifications to comply with Americans with Disabilities Act, natural habitat or wetland mitigation efforts, Intelligent Transportation System (ITS) capital improvements and environmental and pollution abatement projects.
Water and Waste Disposal Loans and Grants	This program provides water and waste disposal facilities and services to low income rural communities whose residents face significant health risks. Funds may be used for 100% construction costs to construct, enlarge, extend, or otherwise improve a community water or sewer system; extend service lines and connect individual residences to a system. The program allows applicants to make grants directly to individuals to extend service lines, connect resident's plumbing to system, pay reasonable charges and fees for connecting to system, installation of plumbing and related fixtures, and construction in dwelling of a bathroom.
Water Pollution Control Program Grants	Section 106 of the Clean Water Act authorizes EPA to provide federal assistance to states and interstate agencies to establish and implement ongoing water pollution control programs. Prevention and control measures supported by pollution control programs include permitting, development of water quality standards and total maximum daily loads, surveillance, ambient water quality monitoring, and enforcement; advice and assistance to local agencies; and the provision of training and public information. Increasingly, EPA and states are working together to develop basin-wide approaches to water quality management. The Water Pollution Control Program is helping to foster a watershed protection approach at the state level by looking at states' water quality problems holistically and targeting the use of limited finances available for effective program management.
Watershed Protection and Flood Prevention (WFPO)	The Watershed and Flood Prevention Operations (WFPO) Program (Watershed Operations) includes the Flood Prevention Operations Program authorized by the Flood Control Act of 1944 (P.L. 78-534) and the provisions of the Watershed Protection and Flood Prevention Act of 1954 (P.L. 83-566). The Flood Control Act originally authorizes the Secretary of Agriculture to install watershed improvement measures in 11 watersheds, also known as pilot watersheds, to reduce flood, sedimentation, and erosion damage; improve the conservation, development, utilization, and disposal of water; and advance the conservation and proper utilization of land. The Watershed Protection and Flood Prevention Act provides for cooperation between the Federal government and the States and their political subdivisions in a program to prevent erosion, floodwater, and sediment damage; to further the conservation, development, utilization, and disposal of water; and to further the conservation and proper utilization of land in authorized watersheds. The Watershed and Flood Prevention Operations (WFPO) Program provides technical and financial assistance to States, local governments and Tribes (project sponsors) to plan and implement authorized watershed project plans.

Wildland Urban Interface Community and Rural Fire Assistance, Program 15.228	This program is designed to implement the National Fire Plan and assist communities at risk from catastrophic wildland fires. The program provides grants, technical assistance, and training for community programs that develop local capability, including: assessment and planning, mitigation activities, and community and homeowner education and action; Hazardous fuels reduction activities, including the training, monitoring or maintenance associated with such hazardous fuels reduction activities, on federal land, or on adjacent nonfederal land for activities that mitigate the threat of catastrophic fire to communities and natural resources in high risk areas. Enhancement of knowledge and fire protection capability of rural fire districts through assistance in education and training, protective clothing and equipment purchase, and mitigation methods on a cost share basis.

Administration of Mitigation Projects, Initiatives or Actions

It is anticipated that the County, the City of Lake City and the Town of Ft. White with regards to any mitigation project(s) that are included in the LMS, will apply for and administer grants for actions within their respective jurisdictions. The following lists of agencies are responsible for carrying out the identified mitigation projects (if applicable) that are contained in the LMS as well as the functions they provide.

Columbia County Emergency Management
The Columbia County Department of Emergency Management is the lead agency responsible to develop and maintain the LMS Plan. This includes annual and 5-year updates and continual maintenance of the LMS mitigation project list. The office is also responsible for managing and overseeing all details for the communities to prepare for, respond to, recover from and mitigate against natural, technological and man-made hazards. The Emergency Management Director is responsible for implementing and administrating the mitigation projects, including researching and identifying funding sources and providing timeframes for the completion of the project.

County and Lake City Building and Zoning Department
Identify, develop and recommend changes to the building and zoning codes that will eliminate or lessen the impact of disasters. Assure enforcement of all existing building and land development regulations. The Building and Zoning Director is responsible for implementing and administrating the mitigation project, including researching and identifying funding sources and providing timeframes for the completion of the project.

County and Lake City Fire Rescue Department
Identify and recommend mitigation goals that will reduce and/or lessen the impact of wildfires within their jurisdiction. Provide education and training that will assist in accomplishing the mitigation goals and objectives. The Fire Chief will take the lead in implementing and administrating the mitigation project, including researching and identifying funding sources and providing timeframes for the completion of the project

County Public Works Department
Provide technical assistance and advice on identifying and accomplishing mitigation actions to improve the design, construction and placement of roads, bridges, culverts, etc., that will eliminate or lessen the impact of disasters. The Public Works Director is responsible for implementing and administrating the mitigation project, including researching and identifying funding sources and providing timeframes for the completion of the project.

County School Board
The Board is responsible for construction and maintenance of public schools used as emergency shelters. The School Board will be responsible for implementation of mitigation actions proposed for public school buildings. The School

Board Superintendent is responsible for implementing and administrating the mitigation project, including researching and identifying funding sources and providing timeframes for the completion of the project.

Columbia County Health Department
Identify and recommend mitigation goals that will reduce and/or lessen the impact for the county residents health and safety within their jurisdiction. Provide education and training that will assist in accomplishing the mitigation goals and objectives. The Health Department Representative will take the lead in implementing and administrating the mitigation project, including researching and identifying funding sources and providing timeframes for the completion of the project.

Town of Ft. White Planning & Zoning Board
Identify, develop and recommend changes to the building and zoning codes that will eliminate or lessen the impact of disasters. Assure enforcement of all existing building and land development regulations. The Building and Zoning Board are responsible for implementing and administrating the mitigation project, including researching and identifying funding sources and providing timeframes for the completion of the project.

United Way of Suwannee Valley
Works with the Suwannee Valley Homeless Coalition and local churches to secure temporary warming shelters for the homeless and others without heat when temperatures fall below 35 degrees Fahrenheit.

Florida Forest Service
Provide technical assistance and advice on all aspects of wildfire issues including identification and accomplishment of mitigation actions designed to reduce the loss of life and real property. The Wildfire Mitigation Specialist is responsible for implementing and administrating the mitigation project, including researching and identifying funding sources and providing timeframes for the completion of the project.

Florida Department of Transportation (FDOT)
Provide technical assistance and advice on identifying and accomplishing mitigation actions to improve the design, construction and placement of roads, bridges, culverts, etc., that will eliminate or lessen the impact of disasters. The FDOT District Two Representative for the area is responsible for implementing and administrating the mitigation project, including researching and identifying funding sources and providing timeframes for the completion of the project.

Florida Division of Emergency Management (FDEM)
Provide technical assistance and funding when available; in all aspects of emergency management in order to better able the county to prepare for, respond to, recover from, and mitigate against natural, technological and man-made hazards.

Suwannee River Water Management District (SRWMD)
Provide technical assistance and advice on identifying and accomplishing mitigation actions to help reduce or eliminate the impact of flooding in the County. The SRWMD Representative is responsible for implementing and administrating the mitigation project, including researching and identifying funding sources and providing timeframes for the completion of the project.

Utility Company
Review and offers recommendations in regard to City subdivision plans and requirements.

Section 6 – Plan Evaluation and Maintenance

Requirements:

§201.6(c)(4)(i): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

§201.6(c)(4)(ii): The plan shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

§201.6(c)(4)(iii): The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process.

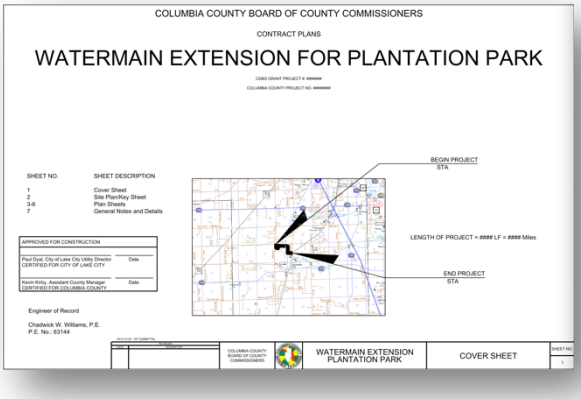
§201.6(d)(3): Was the plan revised to reflect changes in development?

Changes In Development

The Columbia County Local Mitigation Strategy (LMS) is a living document that must continually reflect the changing needs of the communities as the county experiences growth and changes in relation to hazard vulnerability. Changes in land use and development can affect a variety of infrastructure issues such as potable water, sewer, roads, storm water runoff patterns and ecological considerations such as water quality. Natural Hazards and other processes, like erosion, continually alter hazard prone areas.

There have been *some significant changes in development* in Columbia County since the last LMS plan was approved.

(A) Plantation Park Water Line and Street Improvement



Project Location: The project extended the Lake City water service to the Plantation Park subdivision. The roads within Plantation Park were paved (Kimdale Loop and Stratford Glen Road).

Project Description: Include all contemplated actions that logically are either geographically or functionally part of the project: Service Area 1 includes 7,100 linear feet of 12-inch water main to be installed connecting the neighborhood's water service to the City of Lake City municipal water service. Additionally 2,100 linear feet of water lies within the neighborhood will be upgraded to a minimum 8-inch main to accommodate fire hydrants and provide fire protection to the residents. Roads within Plantation Park are

unpaved. Once the water line improvements have been completed, County will pave 2,200 LF of 20-foot wide dirt roads, Kimdale Loop and Stratford Glen.

(B) SW Old Wire Road

Project Location: The project's location is from CR 138 (SW Elm Church Road) to SW Herlong Street

Project Description: The project will include construction of a 24'wide, 2 lane, asphalt roadway over an existing county dirt road for a distance of 3.2 miles. The project also includes stormwater retention ponds on the southern end of the project. The purpose for the project is to improve the traffic flow and enhance safety and mobility. The project was completed in 2018.

Columbia County's Mitigation Projects Update Status

Completed Mitigation Projects

The vulnerability for the County has been reduced and progress has been made due to the mitigation projects that have been completed over the past five years. These projects mitigated flooding, wildfires, riverine erosion, hurricanes, tropical storms, tornadoes, and all hazards that are vulnerable in the incorporated and unincorporated areas of the county. See Table 6.1 – Completed Mitigation Projects.

Deleted Mitigation Projects

Over the last 5 years, the LMS Working Group have analyzed specific mitigation projects that were considered not applicable to the strategy of the LMS and after careful discussion by the group, the projects were deleted from the LMS project or initiative list.

New, Ongoing, and Deferred Mitigation Projects

This list is the "current" LMS project list for the county. There are identified new mitigation projects and the current mitigation projects that are considered ongoing and deferred due to funding at the time.

For specific details on each of the mitigation project lists (*completed, deleted, or new, ongoing and deferred*) are located in the Columbia County Local Mitigation Strategy Project Master List, Appendix B.

Table 6.1 are the mitigation initiatives or projects that have been completed over the last several years. Detailed specifics on the agency responsible for implementation, the estimated total cost for the project, the funding source, and timeframe for project completion are located in Appendix B, the Columbia County Local Mitigation Strategy Project Master List.

Table 6.1 – Mitigation Projects Completed (2015 – 2019)

LMS Mitigation Projects or Initiatives for Columbia County Scope of Work	Hazards Mitigated
Created a retention pond and stormwater routing system to mitigate and reduce the runoff of water at the Florida Gateway Community College.	Flooding, Hurricanes, Tropical Storms and Thunderstorms.
Installed an underground electrical distribution to mitigate storm damage to the electrical grid at the Florida Gateway Community College.	Hurricanes, Tropical Storms, Thunderstorms, and Tornadoes.
Resident Buyouts for repetitive loss properties (*this is also an ongoing mitigation project(s) for the County as 13 projects are currently in the buyout process*).	Flooding, Hurricanes, Tropical Storms and Thunderstorms.
Emergency Shelter Retrofit at the Ft. White High School.	All Hazards
Emergency Shelter Retrofit at the Lake City Middle School.	All Hazards
Emergency Shelter Retrofit at the Summers Elementary School.	All Hazards
Emergency Shelter Retrofit at the Columbia City Elementary School.	All Hazards
Renovated and restored the Rum Island Springs County Park's riverbank due to erosion.	Riverine Erosion
Completed the Community Wildfire Protection Plan (CWPP) including a recent revision and update.	Wildfires
Conducted a series of outreach meetings and workshops educating the County citizens on the natural hazards identified in the LMS Plan.	All Hazards
Columbia County Fire Rescue replaced equipment to improve rescue capabilities.	Wildfires
Established a new fire station in the City of Lake City to assist with fire mitigation.	Wildfires
Established a new fire station in the Columbia City to assist with fire mitigation.	Wildfires

LMS Plan Evaluation, Maintenance and Update

The Columbia County Emergency Management Director in conjunction with the Columbia County LMS Working Group coordinates the following process for monitoring, evaluating, and revising the LMS Plan over the five year period.

Every year the LMS Working Group will meet at least once an annual basis and if necessary on a biannual timeframe to discuss the LMS plan's effectiveness on the following topics:

- Changes to the hazard risk or vulnerability;
- Discuss each mitigation project and update the status:

- ✓ if any mitigation project has been completed - provide as much detail as possible on the project, the hazard mitigated, the cost, and timeframe to complete the project,
- ✓ if any project needs to be removed or deleted, or
- ✓ if there are new mitigation projects or initiatives to added to the master list.

- Review the mitigation goals and objectives to confirm that they are meeting the county's needs;
- Discuss any revision to applicable maps;
- Evaluate the repetitive loss properties data; and
- Changes to the County's critical facilities list.

As a result of these efforts, any significant changes as well as information required in accordance with Florida Statute Chapter 27P-22 will be submitted to the Florida Division of Emergency Management, Mitigation Planning Section within the timeframe outlined in the statute, which is in January.

If in the event a disaster should occur, or other type of emergency in the County, the Working Group may choose to meet early in the recovery and then redevelopment phase, soon after damage assessments are conducted. At this point, the current strategy will be reviewed and necessary changes made based on lessons learned from the response and recovery phase of the disaster. Also, new mitigation projects might be identified as a result of the disaster event and will be considered and added to the mitigation project list if deemed viable.

The Working Group will begin the 5-year update process as close to the 18-months prior to the expiration of the LMS Plan. The plan update will be based on an evaluation and analysis of the risk and vulnerability assessment. The intent is to incorporate any changes in the estimate of replacement costs, new scientific data on hazards, the effects hazards have on the communities, changes in growth patterns, and if there are any reductions in vulnerability due to completion of mitigation projects.

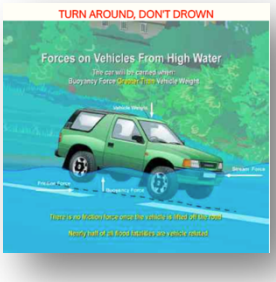
Once the risk assessment is updated, the Working Group will utilize this information and evaluate the goals, objectives, and actions contained in the LMS to determine if they are still applicable.

In addition, the Working Group will evaluate whether or not the communities have the resources available to implement current and new programs and projects. The updated LMS will also capture the planning process followed during the update of the Plan.

During the 5-year LMS evaluation and revision process, *one or more public meetings* will be conducted and include elected and appointed County officials, each participating municipality, and the general public, for consideration of the proposed comments or changes. The updated LMS plan will become available online at the County EM website to give the public an opportunity to review the document prior to the final plan approval.

Continued Public Involvement

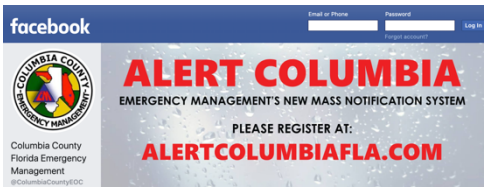
Educating the County citizens on mitigation and public safety is an important issue for Columbia County with these continued and ongoing projects.

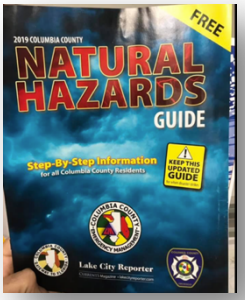


✓ Columbia County, Building & Zoning Department does an excellent job in communication with the County residents especially related to flooding from FIRM's, permitting, to FEMA and Flood Publications. There is a dedicated page to Flood Information from warning to safety measures, flood insurance to property protection measures and a lot more: https://www.columbiacountyfla.com/FloodInformation.asp

- ✓ Emergency Management conducts disaster safety presentations at local organizations, small associations and groups, churches, and local schools.

- ✓ Emergency Management's Facebook page is popular with the County citizens. The page informs residents with the latest on weather, safety and detailed information on the hazards that affect the County, and significantly more.





✓ Every year the Lake City Reporter, the local newspaper, produces a free natural hazards guide for the County citizens on preparedness, planning, emergency shelters, ways to stay informed, emergency contact information and additional specifics.

✓ Annually, the storm spotters program, instruct a class for the County Citizens on improving warning services for hailstorms, wind damage, flash flooding, heavy rain, and tornado events.

- Florida Forest Service, Fire Prevention Program – Smokey Bear remains an active part of our overall prevention message, but our work goes beyond Smokey. Smokey Bear actively visits the schools in Columbia County to promote wildfire safety and the benefits of fire prevention.

- The Firewise Communities Program educates homeowners and community professionals about creating defensible space around their homes, helping to protect them from the dangers of wildfire.

- Columbia County Fire Rescue expanded a fire prevention program to spread the news on fire safety to children and adults.

The Columbia County LMS Working Group held scheduled meetings throughout the 5-year mitigation planning process cycle. All meetings will be public meetings as required by Article I, 24 (b) of the Florida Constitution and any exceptions to this law would have to be duly noted. There was an opportunity at every meeting for the public citizens to provide comment on the Local Mitigation Strategy and planning process for updating the LMS.

A legal notice of all County LMS meetings will be advertised on the online websites and in the following printed newspapers prior to each meeting inviting the public to attend and participate:

There were several opportunities to include the public citizens in the LMS planning. All LMS meeting notices were announced at the:

✓ Columbia County Emergency Management website:
http://www.columbiacountyem.com/

- ✓ Columbia County Department of Emergency Management Facebook: https://www.facebook.com/pg/ColumbiaCountyEOC/photos/?ref=page_internal

- ✓ Columbia County Florida, Meeting Calendar: https://www.columbiacountyfla.com/MeetingCalendar.asp

- ✓ The Lake City Reporter: http://www.lakecityreporter.com/

The LMS Working Group provided an alternative method for those interested in the County mitigation efforts and are unable to attend the LMS meetings. A current copy of the 2020 LMS Plan was available to the public for review online from June 3 – 5, 2020 at the Columbia County EM office:

https://www.columbiacountyfla.com/EmergencyMgt_911.asp .

The county citizens were encouraged to submit their comments and provide feedback to the Emergency Management Director, Shayne Morgan at: shayne_morgan@columbiacountyfla.com by the close of business day on the 5th. The commentary was considered before the final draft of the LMS Plan is presented to the State.

The LMS Working Group will hold at least one public meeting to solicit formal comments from the public prior to the final plan approval. After approval by the County LMS Working Group, the revised plan and appropriate crosswalk will be submitted to the State for review and final approval.

Upon receiving an "approved pending adoption" letter from the FDEM, the LMS Working Group will present the updated plan to the Board of County Commissioners as well as the Commissions of the City of Lake City and the Town of Fort White for approval and adoption. At least one jurisdiction must adopt the updated plan within one year of receiving "approved pending adoption" letter in order to receive a final approval. All other jurisdictions must adopt the updated plan in order to be eligible for federal mitigation grant funds.